

WEBVTT

NOTE duration:"00:51:13.6640000"

NOTE language:en-us

NOTE Confidence: 0.85820043

00:00:02.590 --> 00:00:04.732 Hello and welcome to the what do

NOTE Confidence: 0.85820043

00:00:04.732 --> 00:00:07.117 we know about Long Cove and how

NOTE Confidence: 0.85820043

00:00:07.117 --> 00:00:08.857 might a vaccine help webinar?

NOTE Confidence: 0.85820043

00:00:08.860 --> 00:00:10.455 Please put any questions for

NOTE Confidence: 0.85820043

00:00:10.455 --> 00:00:12.490 the speaker in the Q&A panel,

NOTE Confidence: 0.85820043

00:00:12.490 --> 00:00:14.470 and Please note that this session

NOTE Confidence: 0.85820043

00:00:14.470 --> 00:00:16.120 is being recorded. Thank you.

NOTE Confidence: 0.8581596

00:00:20.900 --> 00:00:22.100 Good morning everyone and

NOTE Confidence: 0.8581596

00:00:22.100 --> 00:00:23.600 thank you for joining us.

NOTE Confidence: 0.8581596

00:00:23.600 --> 00:00:25.115 For Akiko of Esaki's presentation

NOTE Confidence: 0.8581596

00:00:25.115 --> 00:00:27.260 on long COVID and how a vaccine

NOTE Confidence: 0.8581596

00:00:27.260 --> 00:00:29.262 may help as the director of Alumni

NOTE Confidence: 0.8581596

00:00:29.262 --> 00:00:31.096 Affairs at Yale School of Medicine,

NOTE Confidence: 0.8581596

00:00:31.100 --> 00:00:33.277 it gives me great pleasure to welcome

NOTE Confidence: 0.8581596

00:00:33.277 --> 00:00:35.898 you to our first and hopefully last.

NOTE Confidence: 0.8581596

00:00:35.900 --> 00:00:36.962 Virtual reunion weekend.

NOTE Confidence: 0.8581596

00:00:36.962 --> 00:00:39.440 For those who have not had the

NOTE Confidence: 0.8581596

00:00:39.506 --> 00:00:41.844 chance to meet or hear Akiko present

NOTE Confidence: 0.8581596

00:00:41.844 --> 00:00:44.268 before allow me a brief introduction,

NOTE Confidence: 0.8581596

00:00:44.270 --> 00:00:46.503 she joined Yale as a faculty member

NOTE Confidence: 0.8581596

00:00:46.503 --> 00:00:48.722 in 2000 and is currently the wall

NOTE Confidence: 0.8581596

00:00:48.722 --> 00:00:51.142 to more of an xet fits professor

NOTE Confidence: 0.8581596

00:00:51.142 --> 00:00:53.366 of Immunobiology and Molecular,

NOTE Confidence: 0.8581596

00:00:53.370 --> 00:00:56.098 cellular and developmental biology.

NOTE Confidence: 0.8581596

00:00:56.100 --> 00:00:58.565 The genealogy and my microbial

NOTE Confidence: 0.8581596

00:00:58.565 --> 00:01:00.537 diseases professor of molecular,

NOTE Confidence: 0.8581596

00:01:00.540 --> 00:01:03.740 cellular and developmental biology.

NOTE Confidence: 0.8581596

00:01:03.740 --> 00:01:05.710 The Howard Hughes Medical Institute.

NOTE Confidence: 0.8581596

00:01:05.710 --> 00:01:07.675 Her research is focused on

NOTE Confidence: 0.8581596

00:01:07.675 --> 00:01:09.247 understanding how viruses are  
NOTE Confidence: 0.8581596

00:01:09.247 --> 00:01:10.974 recognized in eight community and  
NOTE Confidence: 0.8581596

00:01:10.974 --> 00:01:12.876 how that information is used to  
NOTE Confidence: 0.8581596

00:01:12.937 --> 00:01:15.169 generate protective adaptive immunity.  
NOTE Confidence: 0.8581596

00:01:15.170 --> 00:01:17.265 She has received numerous honors  
NOTE Confidence: 0.8581596

00:01:17.265 --> 00:01:20.246 during her career and most notably has  
NOTE Confidence: 0.8581596

00:01:20.246 --> 00:01:22.676 been newly elected to the American  
NOTE Confidence: 0.8581596

00:01:22.676 --> 00:01:24.838 Academy of Arts and Sciences.  
NOTE Confidence: 0.8581596

00:01:24.840 --> 00:01:26.315 If you enjoyed her presentation  
NOTE Confidence: 0.8581596

00:01:26.315 --> 00:01:28.369 and I have no doubt you will,  
NOTE Confidence: 0.8581596

00:01:28.370 --> 00:01:30.128 please seek out more of her  
NOTE Confidence: 0.8581596

00:01:30.128 --> 00:01:31.007 work and insights.  
NOTE Confidence: 0.8581596

00:01:31.010 --> 00:01:32.962 She is very active on social media and  
NOTE Confidence: 0.8581596

00:01:32.962 --> 00:01:35.198 gained a following on Twitter for her  
NOTE Confidence: 0.8581596

00:01:35.198 --> 00:01:36.888 public health advice about COVID-19.  
NOTE Confidence: 0.8581596

00:01:36.890 --> 00:01:38.070 Advocating for social distancing

NOTE Confidence: 0.8581596

00:01:38.070 --> 00:01:39.250 early in the pandemic.

NOTE Confidence: 0.8581596

00:01:39.250 --> 00:01:41.594 I will moderate our Q&A in the end,

NOTE Confidence: 0.8581596

00:01:41.600 --> 00:01:43.430 so please submit any questions you

NOTE Confidence: 0.8581596

00:01:43.430 --> 00:01:45.815 have in the chat feature and we will

NOTE Confidence: 0.8581596

00:01:45.815 --> 00:01:48.069 address as many as we have time for.

NOTE Confidence: 0.8581596

00:01:48.070 --> 00:01:50.414 I will now turn it over to Akiko.

NOTE Confidence: 0.8869549

00:01:51.700 --> 00:01:53.710 Thank you Aaron for the

NOTE Confidence: 0.8869549

00:01:53.710 --> 00:01:54.916 very kind introduction.

NOTE Confidence: 0.8869549

00:01:54.920 --> 00:01:57.720 I'm happy to be here today to give

NOTE Confidence: 0.8869549

00:01:57.720 --> 00:02:01.029 you a update and what we are doing

NOTE Confidence: 0.8869549

00:02:01.029 --> 00:02:03.759 to help people with long COVID.

NOTE Confidence: 0.8869549

00:02:03.760 --> 00:02:06.567 So I'm going to share my screen.

NOTE Confidence: 0.83959585

00:02:11.370 --> 00:02:15.519 OK, so today I want to tell you about

NOTE Confidence: 0.83959585

00:02:15.519 --> 00:02:19.825 long COVID an how might a vaccine help?

NOTE Confidence: 0.83959585

00:02:19.830 --> 00:02:22.266 And this is really an ongoing work

NOTE Confidence: 0.83959585

00:02:22.266 --> 00:02:24.538 that involves a large number of  
NOTE Confidence: 0.83959585

00:02:24.538 --> 00:02:26.854 people here at Yale and elsewhere.  
NOTE Confidence: 0.8740169

00:02:29.620 --> 00:02:32.500 So my laboratory has been collaborating  
NOTE Confidence: 0.8740169

00:02:32.500 --> 00:02:36.652 with a large group at Yale to try to  
NOTE Confidence: 0.8740169

00:02:36.652 --> 00:02:39.550 understand the outcome of COVID-19 disease,  
NOTE Confidence: 0.8740169

00:02:39.550 --> 00:02:41.742 particularly from the standpoint  
NOTE Confidence: 0.8740169

00:02:41.742 --> 00:02:43.934 of the immune response.  
NOTE Confidence: 0.8740169

00:02:43.940 --> 00:02:48.165 We know that COVID-19 can  
NOTE Confidence: 0.8740169

00:02:48.165 --> 00:02:50.700 cause asymptomatic infection.  
NOTE Confidence: 0.8740169

00:02:50.700 --> 00:02:53.738 And all the way to fatal infection,  
NOTE Confidence: 0.8740169

00:02:53.740 --> 00:02:57.556 and this really did depends on the host  
NOTE Confidence: 0.8740169

00:02:57.556 --> 00:03:00.677 immune status as well as age and sex.  
NOTE Confidence: 0.8740169

00:03:00.680 --> 00:03:03.824 So we know that the outcome of Cobett  
NOTE Confidence: 0.8740169

00:03:03.824 --> 00:03:06.524 19 disease really differ between the  
NOTE Confidence: 0.8740169

00:03:06.524 --> 00:03:10.228 different age group as well as sex as  
NOTE Confidence: 0.8740169

00:03:10.228 --> 00:03:12.832 well as core mobility and pregnancy

NOTE Confidence: 0.8740169

00:03:12.832 --> 00:03:15.436 status and many other things that

NOTE Confidence: 0.8740169

00:03:15.436 --> 00:03:18.040 could affect the host immune response.

NOTE Confidence: 0.8740169

00:03:18.040 --> 00:03:20.172 And so, for instance,

NOTE Confidence: 0.8740169

00:03:20.172 --> 00:03:22.304 we've been looking at.

NOTE Confidence: 0.8740169

00:03:22.310 --> 00:03:24.845 Hospitalised patients immune response to

NOTE Confidence: 0.8740169

00:03:24.845 --> 00:03:27.959 COVID-19 from moderate to fatal disease

NOTE Confidence: 0.8740169

00:03:27.959 --> 00:03:30.977 and discovered so many different insights.

NOTE Confidence: 0.8740169

00:03:30.980 --> 00:03:31.944 For example,

NOTE Confidence: 0.8740169

00:03:31.944 --> 00:03:35.318 the severe COVID is really a company

NOTE Confidence: 0.8740169

00:03:35.318 --> 00:03:39.135 by a misfiring of the immune response,

NOTE Confidence: 0.8740169

00:03:39.140 --> 00:03:41.690 meaning that different parts of

NOTE Confidence: 0.8740169

00:03:41.690 --> 00:03:44.240 the immune system are engaged,

NOTE Confidence: 0.8740169

00:03:44.240 --> 00:03:46.440 normally reserved for fighting

NOTE Confidence: 0.8740169

00:03:46.440 --> 00:03:49.740 fungal or parasite infection are all

NOTE Confidence: 0.8740169

00:03:49.827 --> 00:03:52.617 being engaged in the severe COVID.

NOTE Confidence: 0.8740169

00:03:52.620 --> 00:03:55.884 And this becomes a maladapted immune  
NOTE Confidence: 0.8740169

00:03:55.884 --> 00:03:59.630 response to fighting a viral infection.  
NOTE Confidence: 0.8740169

00:03:59.630 --> 00:04:03.694 We also know that in fatal COVID cases.  
NOTE Confidence: 0.8740169

00:04:03.700 --> 00:04:06.592 Things that should have happened earlier  
NOTE Confidence: 0.8740169

00:04:06.592 --> 00:04:09.080 during immune response didn't happen,  
NOTE Confidence: 0.8740169

00:04:09.080 --> 00:04:12.559 and that really results in uncontrolled viral  
NOTE Confidence: 0.8740169

00:04:12.559 --> 00:04:15.438 replication and severe to lethal disease,  
NOTE Confidence: 0.8740169

00:04:15.440 --> 00:04:18.584 and that is really seen for both the  
NOTE Confidence: 0.8740169

00:04:18.584 --> 00:04:20.871 innate immune response which should  
NOTE Confidence: 0.8740169

00:04:20.871 --> 00:04:24.175 happen within hours to days of primary  
NOTE Confidence: 0.8740169

00:04:24.257 --> 00:04:27.169 infection to neutralizing antibodies.  
NOTE Confidence: 0.8740169

00:04:27.170 --> 00:04:31.538 We found that people who don't develop  
NOTE Confidence: 0.8740169

00:04:31.538 --> 00:04:33.410 neutralizing antibodies within  
NOTE Confidence: 0.8740169

00:04:33.504 --> 00:04:36.486 the 1st 14 days of symptom onset.  
NOTE Confidence: 0.8740169

00:04:36.490 --> 00:04:39.367 Are enriched in the lethal COVID group,  
NOTE Confidence: 0.8740169

00:04:39.370 --> 00:04:42.658 so this kind of delay in the onset

NOTE Confidence: 0.8740169

00:04:42.658 --> 00:04:44.904 of appropriate immune response is

NOTE Confidence: 0.8740169

00:04:44.904 --> 00:04:48.600 really at the basis of our failure to

NOTE Confidence: 0.8740169

00:04:48.600 --> 00:04:51.570 cope with this virus and therefore

NOTE Confidence: 0.8740169

00:04:51.570 --> 00:04:53.055 succumb to infection.

NOTE Confidence: 0.8740169

00:04:53.060 --> 00:04:56.588 We've also done a lot of work on comparing

NOTE Confidence: 0.8740169

00:04:56.588 --> 00:04:59.717 sex differences in immune response,

NOTE Confidence: 0.8740169

00:04:59.720 --> 00:05:03.052 and this was really initiated by the

NOTE Confidence: 0.8740169

00:05:03.052 --> 00:05:05.488 support of Women's Health research

NOTE Confidence: 0.8740169

00:05:05.488 --> 00:05:08.701 at Yale here and has really taken

NOTE Confidence: 0.8740169

00:05:08.701 --> 00:05:10.199 off since then.

NOTE Confidence: 0.8740169

00:05:10.200 --> 00:05:13.584 Now there are numerous reports showing

NOTE Confidence: 0.8740169

00:05:13.584 --> 00:05:17.004 differences in male and female immune

NOTE Confidence: 0.8740169

00:05:17.004 --> 00:05:21.292 response to COVID and how that might explain.

NOTE Confidence: 0.8740169

00:05:21.300 --> 00:05:24.786 The risk factor for males being having

NOTE Confidence: 0.8740169

00:05:24.786 --> 00:05:28.793 a higher risk factor for lethal and

NOTE Confidence: 0.8740169



00:05:28.793 --> 00:05:32.411 severe COVID compared to female patients.

NOTE Confidence: 0.8740169

00:05:32.420 --> 00:05:35.871 And we've also been looking at the

NOTE Confidence: 0.8740169

00:05:35.871 --> 00:05:38.659 impact of COVID-19 in pregnancy,

NOTE Confidence: 0.8740169

00:05:38.660 --> 00:05:42.139 and have seen both subtle to severe

NOTE Confidence: 0.8740169

00:05:42.139 --> 00:05:44.626 consequences of kovit infection in

NOTE Confidence: 0.8740169

00:05:44.626 --> 00:05:48.250 pregnant women as well as impact on the

NOTE Confidence: 0.8740169

00:05:48.345 --> 00:05:51.660 placenta from a respiratory infection.

NOTE Confidence: 0.8740169

00:05:51.660 --> 00:05:53.740 Really highlighting that this

NOTE Confidence: 0.8740169

00:05:53.740 --> 00:05:54.780 particular virus,

NOTE Confidence: 0.8740169

00:05:54.780 --> 00:05:58.420 even though it's just a respiratory virus,

NOTE Confidence: 0.8740169

00:05:58.420 --> 00:06:01.055 has a huge impact throughout

NOTE Confidence: 0.8740169

00:06:01.055 --> 00:06:02.636 the body without.

NOTE Confidence: 0.8740169

00:06:02.640 --> 00:06:04.878 Infecting the Oregon it can have

NOTE Confidence: 0.8740169

00:06:04.878 --> 00:06:07.167 affect remote effect because of the

NOTE Confidence: 0.8740169

00:06:07.167 --> 00:06:09.369 information that's happening in the lung.

NOTE Confidence: 0.8601153

00:06:11.640 --> 00:06:15.416 There are others that Yale who are really

NOTE Confidence: 0.8601153

00:06:15.416 --> 00:06:18.020 investigating what happens in children.

NOTE Confidence: 0.8601153

00:06:18.020 --> 00:06:20.966 Doctor Kevin Harreld's group, for example,

NOTE Confidence: 0.8601153

00:06:20.970 --> 00:06:23.622 reported that there is a robust

NOTE Confidence: 0.8601153

00:06:23.622 --> 00:06:26.496 immune response that can control the

NOTE Confidence: 0.8601153

00:06:26.496 --> 00:06:29.574 virus in children and therefore most

NOTE Confidence: 0.8601153

00:06:29.574 --> 00:06:32.259 children recover with mild infection,

NOTE Confidence: 0.8601153

00:06:32.260 --> 00:06:35.305 whereas there are a handful of children

NOTE Confidence: 0.8601153

00:06:35.305 --> 00:06:38.150 who have multi organ involvement.

NOTE Confidence: 0.8601153

00:06:38.150 --> 00:06:39.156 Inflammatory diseases,

NOTE Confidence: 0.8601153

00:06:39.156 --> 00:06:42.677 which also is a mystery right now.

NOTE Confidence: 0.8601153

00:06:42.680 --> 00:06:45.020 Why do these handful of children

NOTE Confidence: 0.8601153

00:06:45.020 --> 00:06:47.439 become so severely ill from COVID?

NOTE Confidence: 0.8601153

00:06:47.440 --> 00:06:50.219 And that's a work of a doctor?

NOTE Confidence: 0.8601153

00:06:50.220 --> 00:06:52.205 Carrie Lucas in the same

NOTE Confidence: 0.8601153

00:06:52.205 --> 00:06:54.190 department looking at these issues,

NOTE Confidence: 0.8601153

00:06:54.190 --> 00:06:56.446 but today I really want to  
NOTE Confidence: 0.8601153

00:06:56.446 --> 00:06:58.959 focus on long haul or disease.  
NOTE Confidence: 0.8601153

00:06:58.960 --> 00:06:59.953 First of all,  
NOTE Confidence: 0.8601153

00:06:59.953 --> 00:07:01.939 what is long COVID and what  
NOTE Confidence: 0.8601153

00:07:01.939 --> 00:07:04.118 are the symptoms associated?  
NOTE Confidence: 0.8601153

00:07:04.120 --> 00:07:06.100 How long do they last?  
NOTE Confidence: 0.8601153

00:07:06.100 --> 00:07:08.090 What are the people affected?  
NOTE Confidence: 0.8601153

00:07:08.090 --> 00:07:08.914 And finally,  
NOTE Confidence: 0.8601153

00:07:08.914 --> 00:07:11.386 I want to start talking about  
NOTE Confidence: 0.8601153

00:07:11.386 --> 00:07:13.250 potential therapy for lung COVID  
NOTE Confidence: 0.867002

00:07:16.370 --> 00:07:19.184 so long COVID was already detected  
NOTE Confidence: 0.867002

00:07:19.184 --> 00:07:22.388 last summer as people were experiencing  
NOTE Confidence: 0.867002

00:07:22.388 --> 00:07:25.498 very extended symptoms from COVID.  
NOTE Confidence: 0.867002

00:07:25.500 --> 00:07:28.860 And you know, some people even had very  
NOTE Confidence: 0.867002

00:07:28.860 --> 00:07:32.156 mild to asymptomatic infection but are  
NOTE Confidence: 0.867002

00:07:32.156 --> 00:07:35.696 beginning to develop very long term

NOTE Confidence: 0.867002

00:07:35.792 --> 00:07:39.278 symptoms afterwards and so long COVID

NOTE Confidence: 0.867002

00:07:39.278 --> 00:07:42.253 patients experience a large number

NOTE Confidence: 0.867002

00:07:42.253 --> 00:07:46.754 of symptoms which I will go into.

NOTE Confidence: 0.867002

00:07:46.760 --> 00:07:49.365 Weeks or months after infection

NOTE Confidence: 0.867002

00:07:49.365 --> 00:07:51.449 for extended time period.

NOTE Confidence: 0.867002

00:07:51.450 --> 00:07:55.160 So most common symptom is fatigue and

NOTE Confidence: 0.867002

00:07:55.160 --> 00:07:59.257 this isn't just a little bit of fatigue,

NOTE Confidence: 0.867002

00:07:59.260 --> 00:08:02.272 it's a severe fatigue that people

NOTE Confidence: 0.867002

00:08:02.272 --> 00:08:04.815 become debilitated from this this

NOTE Confidence: 0.867002

00:08:04.815 --> 00:08:07.533 disease and post exertional malaise is

NOTE Confidence: 0.867002

00:08:07.533 --> 00:08:11.342 a second top symptom that long COVID

NOTE Confidence: 0.867002

00:08:11.342 --> 00:08:13.706 patients experienced and cognitive

NOTE Confidence: 0.867002

00:08:13.706 --> 00:08:18.090 dysfunction is also a large symptom.

NOTE Confidence: 0.867002

00:08:18.090 --> 00:08:22.090 That longer population experience and.

NOTE Confidence: 0.867002

00:08:22.090 --> 00:08:23.940 Majority have evidence of multiple

NOTE Confidence: 0.867002

00:08:23.940 --> 00:08:27.180 organ disease, which I will get into.  
NOTE Confidence: 0.867002

00:08:27.180 --> 00:08:28.587 The long COVID,  
NOTE Confidence: 0.867002

00:08:28.587 --> 00:08:31.401 unlike the severe COVID that we  
NOTE Confidence: 0.867002

00:08:31.401 --> 00:08:33.379 study in the hospital,  
NOTE Confidence: 0.867002

00:08:33.380 --> 00:08:36.242 the long COVID patients are more  
NOTE Confidence: 0.867002

00:08:36.242 --> 00:08:38.150 dominated by younger female,  
NOTE Confidence: 0.867002

00:08:38.150 --> 00:08:41.198 so the Middle Age Group 30 to 50  
NOTE Confidence: 0.867002

00:08:41.198 --> 00:08:44.468 year old and that is really the  
NOTE Confidence: 0.867002

00:08:44.468 --> 00:08:47.526 most affected from long COVID and  
NOTE Confidence: 0.867002

00:08:47.526 --> 00:08:50.814 that also happens to coincide with  
NOTE Confidence: 0.867002

00:08:50.814 --> 00:08:52.941 the demographic most affected  
NOTE Confidence: 0.867002

00:08:52.941 --> 00:08:54.384 by autoimmune diseases.  
NOTE Confidence: 0.867002

00:08:54.384 --> 00:08:58.540 So the estimates of how many people develop.  
NOTE Confidence: 0.867002

00:08:58.540 --> 00:09:00.720 COVID vary between different studies,  
NOTE Confidence: 0.867002

00:09:00.720 --> 00:09:02.890 some of them say 5%.  
NOTE Confidence: 0.867002

00:09:02.890 --> 00:09:05.070 Some of them say 70%,

NOTE Confidence: 0.867002

00:09:05.070 --> 00:09:08.550 but roughly about 10 to 20% of the

NOTE Confidence: 0.867002

00:09:08.550 --> 00:09:11.160 COVID survivors develop Long Cove in,

NOTE Confidence: 0.867002

00:09:11.160 --> 00:09:13.860 and this you know estimates about

NOTE Confidence: 0.867002

00:09:13.860 --> 00:09:16.143 5,000,000 cases of expected long

NOTE Confidence: 0.867002

00:09:16.143 --> 00:09:18.549 COVID in the United States alone,

NOTE Confidence: 0.867002

00:09:18.550 --> 00:09:20.896 which is a huge problem because

NOTE Confidence: 0.867002

00:09:20.896 --> 00:09:23.739 these people are no longer able to

NOTE Confidence: 0.867002

00:09:23.739 --> 00:09:26.532 function as they did before and would

NOTE Confidence: 0.867002

00:09:26.610 --> 00:09:28.990 have a significant consequence,

NOTE Confidence: 0.867002

00:09:28.990 --> 00:09:29.894 both economical.

NOTE Confidence: 0.867002

00:09:29.894 --> 00:09:32.606 As well as health care costs

NOTE Confidence: 0.867002

00:09:32.606 --> 00:09:34.330 associated with one COVID.

NOTE Confidence: 0.867002

00:09:34.330 --> 00:09:37.361 And another study showed that the loan

NOTE Confidence: 0.867002

00:09:37.361 --> 00:09:39.340 COVID percentages decline overtime,

NOTE Confidence: 0.867002

00:09:39.340 --> 00:09:42.245 so it's not that everyone who has

NOTE Confidence: 0.867002

00:09:42.245 --> 00:09:45.707 long COVID is going to suffer forever.  
NOTE Confidence: 0.867002

00:09:45.710 --> 00:09:48.440 The numbers and percentage decline overtime.  
NOTE Confidence: 0.867002

00:09:48.440 --> 00:09:49.877 So for example,  
NOTE Confidence: 0.867002

00:09:49.877 --> 00:09:52.272 13% of the participants had  
NOTE Confidence: 0.867002

00:09:52.272 --> 00:09:54.350 symptoms lasting over 28 days,  
NOTE Confidence: 0.867002

00:09:54.350 --> 00:09:57.535 but then that percentage drop after weeks.  
NOTE Confidence: 0.867002

00:09:57.540 --> 00:10:00.264 So after 12 weeks the percentage  
NOTE Confidence: 0.867002

00:10:00.264 --> 00:10:01.626 dropped about 2%.  
NOTE Confidence: 0.867002

00:10:01.630 --> 00:10:04.899 But there are people who are suffering.  
NOTE Confidence: 0.867002

00:10:04.900 --> 00:10:06.508 Suffering for more than  
NOTE Confidence: 0.867002

00:10:06.508 --> 00:10:08.518 a year with long COVID.  
NOTE Confidence: 0.867002

00:10:08.520 --> 00:10:10.192 And as I mentioned,  
NOTE Confidence: 0.867002

00:10:10.192 --> 00:10:12.282 it's a really debilitating disease.  
NOTE Confidence: 0.867002

00:10:12.290 --> 00:10:15.216 40% of cases require reduction in workload  
NOTE Confidence: 0.867002

00:10:15.216 --> 00:10:18.580 and 22% are unable to return to work,  
NOTE Confidence: 0.867002

00:10:18.580 --> 00:10:21.804 so this is a major crisis going forward

NOTE Confidence: 0.867002  
00:10:21.804 --> 00:10:25.277 even after we contain COVID with a vaccine,  
NOTE Confidence: 0.867002  
00:10:25.280 --> 00:10:27.500 there will be millions of people  
NOTE Confidence: 0.867002  
00:10:27.500 --> 00:10:29.890 suffering from long term consequences.  
NOTE Confidence: 0.81534874  
00:10:32.150 --> 00:10:35.181 And as I mentioned, long COVID is  
NOTE Confidence: 0.81534874  
00:10:35.181 --> 00:10:38.060 not just one organ, one symptom.  
NOTE Confidence: 0.81534874  
00:10:38.060 --> 00:10:41.280 It really has over 120 different symptoms  
NOTE Confidence: 0.81534874  
00:10:41.280 --> 00:10:44.301 that have been reported and that appear  
NOTE Confidence: 0.81534874  
00:10:44.301 --> 00:10:47.129 to involve so many organ systems.  
NOTE Confidence: 0.81534874  
00:10:47.130 --> 00:10:49.400 Systemic effects such as fever,  
NOTE Confidence: 0.81534874  
00:10:49.400 --> 00:10:53.260 fatigue, and post exertional malaise.  
NOTE Confidence: 0.81534874  
00:10:53.260 --> 00:10:55.168 Other symptoms that appear  
NOTE Confidence: 0.81534874  
00:10:55.168 --> 00:10:58.030 to just kind of be systemic,  
NOTE Confidence: 0.81534874  
00:10:58.030 --> 00:11:00.410 whereas there are distinct neuro  
NOTE Confidence: 0.81534874  
00:11:00.410 --> 00:11:02.314 psychiatric impact memory deficit,  
NOTE Confidence: 0.81534874  
00:11:02.320 --> 00:11:04.710 loss of ability to concentrate,  
NOTE Confidence: 0.81534874



00:11:04.710 --> 00:11:06.138 and mood disorders.  
NOTE Confidence: 0.81534874

00:11:06.138 --> 00:11:08.998 This is really, really severe in  
NOTE Confidence: 0.81534874

00:11:08.998 --> 00:11:11.854 some people and there is dizziness,  
NOTE Confidence: 0.81534874

00:11:11.860 --> 00:11:14.458 headache, blurry vision.  
NOTE Confidence: 0.81534874

00:11:14.460 --> 00:11:16.692 Many different endocrine cardiovascular,  
NOTE Confidence: 0.81534874

00:11:16.692 --> 00:11:17.806 pulmonary, musculoskeletal,  
NOTE Confidence: 0.81534874

00:11:17.806 --> 00:11:21.698 and GI tract symptoms have been reported.  
NOTE Confidence: 0.86920714

00:11:24.310 --> 00:11:26.878 And just to kind of reiterate,  
NOTE Confidence: 0.86920714

00:11:26.880 --> 00:11:29.030 the demographic data being quite  
NOTE Confidence: 0.86920714

00:11:29.030 --> 00:11:30.750 different from severe COVID.  
NOTE Confidence: 0.86920714

00:11:30.750 --> 00:11:33.614 This is a study from a Mount Sinai  
NOTE Confidence: 0.86920714

00:11:33.614 --> 00:11:35.888 group of Precision Recovery program  
NOTE Confidence: 0.86920714

00:11:35.888 --> 00:11:39.325 that they have in in this group.  
NOTE Confidence: 0.86920714

00:11:39.330 --> 00:11:41.470 Again, women are dominant at  
NOTE Confidence: 0.86920714

00:11:41.470 --> 00:11:44.060 69% of the their patients are  
NOTE Confidence: 0.86920714

00:11:44.060 --> 00:11:47.050 women and mean age is only 44,

NOTE Confidence: 0.86920714

00:11:47.050 --> 00:11:49.618 so 12 to 81. It varies,

NOTE Confidence: 0.86920714

00:11:49.620 --> 00:11:53.616 but mean is really is around 30 to 50.

NOTE Confidence: 0.86920714

00:11:53.620 --> 00:11:55.528 No, that range group.

NOTE Confidence: 0.86920714

00:11:55.528 --> 00:11:57.913 And the BMI it again.

NOTE Confidence: 0.86920714

00:11:57.920 --> 00:12:01.790 The BMI high BMI is a risk factor for

NOTE Confidence: 0.86920714

00:12:01.790 --> 00:12:04.966 severe COVID and for Long Cove it,

NOTE Confidence: 0.86920714

00:12:04.970 --> 00:12:08.327 it appears that the mean BMI is normal and

NOTE Confidence: 0.86920714

00:12:08.327 --> 00:12:11.744 then there are other sort of comorbidities

NOTE Confidence: 0.86920714

00:12:11.744 --> 00:12:14.669 that are associated with long COVID,

NOTE Confidence: 0.86920714

00:12:14.670 --> 00:12:18.190 but there's not a unifying.

NOTE Confidence: 0.86920714

00:12:18.190 --> 00:12:20.680 A picture of what people had

NOTE Confidence: 0.86920714

00:12:20.680 --> 00:12:22.870 before they developed long COVID.

NOTE Confidence: 0.8334782

00:12:25.180 --> 00:12:28.295 And if you look at the symptoms,

NOTE Confidence: 0.8334782

00:12:28.300 --> 00:12:31.415 severity and the number of symptoms overtime,

NOTE Confidence: 0.8334782

00:12:31.420 --> 00:12:34.451 what you see is something like this

NOTE Confidence: 0.8334782

00:12:34.451 --> 00:12:37.153 where vast majority of this severity

NOTE Confidence: 0.8334782

00:12:37.153 --> 00:12:39.799 score that goes extends to seven

NOTE Confidence: 0.8334782

00:12:39.799 --> 00:12:42.127 months are the moderate group,

NOTE Confidence: 0.8334782

00:12:42.130 --> 00:12:44.800 whereas a severe and very severe.

NOTE Confidence: 0.8334782

00:12:44.800 --> 00:12:47.476 They tend to decline over time,

NOTE Confidence: 0.8334782

00:12:47.480 --> 00:12:48.968 which is great.

NOTE Confidence: 0.8334782

00:12:48.968 --> 00:12:51.944 People are kind of converting to

NOTE Confidence: 0.8334782

00:12:51.944 --> 00:12:55.244 from CV or two a moderate to mild.

NOTE Confidence: 0.8334782

00:12:55.250 --> 00:12:56.092 Disease overtime.

NOTE Confidence: 0.8334782

00:12:56.092 --> 00:12:58.618 And then very mild goes up

NOTE Confidence: 0.8334782

00:12:58.618 --> 00:13:00.499 and then no symptoms.

NOTE Confidence: 0.8334782

00:13:00.500 --> 00:13:03.769 These are the people who stayed low.

NOTE Confidence: 0.8334782

00:13:03.770 --> 00:13:06.584 And if you look at the average

NOTE Confidence: 0.8334782

00:13:06.584 --> 00:13:09.138 number of symptom as I mentioned,

NOTE Confidence: 0.8334782

00:13:09.140 --> 00:13:11.618 everyone has a variety of symptoms,

NOTE Confidence: 0.8334782

00:13:11.620 --> 00:13:13.615 but the ones that don't

NOTE Confidence: 0.8334782

00:13:13.615 --> 00:13:16.160 recover for up to 90 days,

NOTE Confidence: 0.8334782

00:13:16.160 --> 00:13:18.225 they really do have numerous

NOTE Confidence: 0.8334782

00:13:18.225 --> 00:13:20.290 symptoms ranging in the teens.

NOTE Confidence: 0.8334782

00:13:20.290 --> 00:13:22.792 So meaning that they have numerous

NOTE Confidence: 0.8334782

00:13:22.792 --> 00:13:24.924 different organ involvement and symptoms

NOTE Confidence: 0.8334782

00:13:24.924 --> 00:13:27.306 that last for extended time period,

NOTE Confidence: 0.8334782

00:13:27.310 --> 00:13:29.908 whereas those that recovered with an

NOTE Confidence: 0.8334782

00:13:29.908 --> 00:13:32.269 acute or recovered within 90 days.

NOTE Confidence: 0.8334782

00:13:32.270 --> 00:13:34.720 They are symptom number declines.

NOTE Confidence: 0.8334782

00:13:34.720 --> 00:13:36.650 Quite rapidly and within three

NOTE Confidence: 0.8334782

00:13:36.650 --> 00:13:39.270 months they are devoid of symptoms,

NOTE Confidence: 0.8334782

00:13:39.270 --> 00:13:42.007 so really we're interested in this kind

NOTE Confidence: 0.8334782

00:13:42.007 --> 00:13:44.974 of people who are unable to recover

NOTE Confidence: 0.8334782

00:13:44.974 --> 00:13:47.542 over 90 days with numerous symptoms.

NOTE Confidence: 0.85052985

00:13:49.720 --> 00:13:51.750 So what is long COVID?

NOTE Confidence: 0.85052985

00:13:51.750 --> 00:13:54.180 What is how is it cost?  
NOTE Confidence: 0.85052985

00:13:54.180 --> 00:13:56.610 We have a couple of hypothesis.  
NOTE Confidence: 0.85052985

00:13:56.610 --> 00:13:59.186 One is that there is a viral reservoir  
NOTE Confidence: 0.85052985

00:13:59.186 --> 00:14:02.014 that is remaining in these people even  
NOTE Confidence: 0.85052985

00:14:02.014 --> 00:14:04.683 though they cannot detect any PCR  
NOTE Confidence: 0.85052985

00:14:04.683 --> 00:14:07.138 positive virus from their nasopharynx.  
NOTE Confidence: 0.85052985

00:14:07.140 --> 00:14:10.451 There may be virus in different tissues  
NOTE Confidence: 0.85052985

00:14:10.451 --> 00:14:13.537 that cannot be accessed by such a  
NOTE Confidence: 0.85052985

00:14:13.537 --> 00:14:16.494 nasal swab and that may be causing  
NOTE Confidence: 0.85052985

00:14:16.494 --> 00:14:19.494 a chronic in long term symptoms.  
NOTE Confidence: 0.85052985

00:14:19.500 --> 00:14:21.775 And the other possibility hypothesis  
NOTE Confidence: 0.85052985

00:14:21.775 --> 00:14:24.622 is that there is autoreactive immune  
NOTE Confidence: 0.85052985

00:14:24.622 --> 00:14:26.610 responses that are occurring,  
NOTE Confidence: 0.85052985

00:14:26.610 --> 00:14:29.666 so these are the T&B cells of the  
NOTE Confidence: 0.85052985

00:14:29.666 --> 00:14:32.498 immune system that are now attacking  
NOTE Confidence: 0.85052985

00:14:32.498 --> 00:14:34.978 the various different cells or

NOTE Confidence: 0.85052985

00:14:34.978 --> 00:14:37.508 factors within different organs,

NOTE Confidence: 0.85052985

00:14:37.510 --> 00:14:40.821 and that might be leading to the

NOTE Confidence: 0.85052985

00:14:40.821 --> 00:14:43.715 multi organ symptoms that I explained

NOTE Confidence: 0.85052985

00:14:43.715 --> 00:14:45.098 to you before,

NOTE Confidence: 0.85052985

00:14:45.100 --> 00:14:48.166 and so both of these possibilities

NOTE Confidence: 0.85052985

00:14:48.166 --> 00:14:50.210 are still remaining valid.

NOTE Confidence: 0.85052985

00:14:50.210 --> 00:14:53.276 And there is ample evidence for

NOTE Confidence: 0.85052985

00:14:53.276 --> 00:14:56.515 both of these types of disease

NOTE Confidence: 0.85052985

00:14:56.515 --> 00:14:59.235 to be happening with COVID.

NOTE Confidence: 0.85052985

00:14:59.240 --> 00:15:02.820 And so just share with you a couple of these.

NOTE Confidence: 0.85052985

00:15:02.820 --> 00:15:05.412 This is a study that biopsied

NOTE Confidence: 0.85052985

00:15:05.412 --> 00:15:07.680 intestine of patients with COVID.

NOTE Confidence: 0.85052985

00:15:07.680 --> 00:15:11.658 This is a 92 days from the symptom onset,

NOTE Confidence: 0.85052985

00:15:11.660 --> 00:15:14.817 so months after they have had started

NOTE Confidence: 0.85052985

00:15:14.817 --> 00:15:18.434 the symptom and looking at what this is

NOTE Confidence: 0.85052985

00:15:18.434 --> 00:15:21.380 looking at is really source code V2,  
NOTE Confidence: 0.85052985

00:15:21.380 --> 00:15:24.032 which is the virus that causes  
NOTE Confidence: 0.85052985

00:15:24.032 --> 00:15:25.800 COVID new nucleocapsid protein,  
NOTE Confidence: 0.85052985

00:15:25.800 --> 00:15:28.460 which is indicated in green here and  
NOTE Confidence: 0.85052985

00:15:28.460 --> 00:15:31.383 you can see that these intestinal  
NOTE Confidence: 0.85052985

00:15:31.383 --> 00:15:33.647 sections contain cells with.  
NOTE Confidence: 0.85052985

00:15:33.650 --> 00:15:36.344 Very distinct patterns of the nuclear  
NOTE Confidence: 0.85052985

00:15:36.344 --> 00:15:39.359 protein that you can see within the  
NOTE Confidence: 0.85052985

00:15:39.359 --> 00:15:42.012 cytosol of these cells and this is  
NOTE Confidence: 0.85052985

00:15:42.096 --> 00:15:44.604 from the terminal ileum and this  
NOTE Confidence: 0.85052985

00:15:44.604 --> 00:15:46.276 is from the duodenum.  
NOTE Confidence: 0.85052985

00:15:46.280 --> 00:15:49.227 You can see that there are these  
NOTE Confidence: 0.85052985

00:15:49.227 --> 00:15:50.974 nucleocapsid positive cells that  
NOTE Confidence: 0.85052985

00:15:50.974 --> 00:15:53.044 are mostly epithelial cells that  
NOTE Confidence: 0.85052985

00:15:53.044 --> 00:15:54.700 are in the intestine,  
NOTE Confidence: 0.85052985

00:15:54.700 --> 00:15:57.164 and they found five out of 14

NOTE Confidence: 0.85052985

00:15:57.164 --> 00:15:59.749 people who had positive staining.

NOTE Confidence: 0.85052985

00:15:59.750 --> 00:16:01.860 For SARS Co V2 antigen.

NOTE Confidence: 0.85052985

00:16:01.860 --> 00:16:04.260 After an extended time period.

NOTE Confidence: 0.85052985

00:16:04.260 --> 00:16:06.984 Indicating that the viral reservoir could

NOTE Confidence: 0.85052985

00:16:06.984 --> 00:16:10.368 be happening in the long COVID patients.

NOTE Confidence: 0.8219955

00:16:12.610 --> 00:16:14.845 Another possibility is the autoimmunity

NOTE Confidence: 0.8219955

00:16:14.845 --> 00:16:18.691 and this is a work that we published

NOTE Confidence: 0.8219955

00:16:18.691 --> 00:16:21.236 very recently where in collaboration

NOTE Confidence: 0.8219955

00:16:21.236 --> 00:16:24.108 with Doctor Aaron Rings Laboratory,

NOTE Confidence: 0.8219955

00:16:24.110 --> 00:16:28.205 we dissected the existence of auto antibodies

NOTE Confidence: 0.8219955

00:16:28.205 --> 00:16:32.439 and COVID-19 and I want to take you through

NOTE Confidence: 0.8219955

00:16:32.439 --> 00:16:36.110 some of the key data from this study.

NOTE Confidence: 0.8219955

00:16:36.110 --> 00:16:39.183 So doctor ranks laboratory developed a new

NOTE Confidence: 0.8219955

00:16:39.183 --> 00:16:42.190 tool called rapid extracellular antigen.

NOTE Confidence: 0.8219955

00:16:42.190 --> 00:16:45.963 Profiling rape this is a powerful new

NOTE Confidence: 0.8219955



00:16:45.963 --> 00:16:49.641 technology in which you can assess the  
NOTE Confidence: 0.8219955

00:16:49.641 --> 00:16:53.182 ability of a patients antibody to bind  
NOTE Confidence: 0.8219955

00:16:53.182 --> 00:16:56.619 to variety of self antigens that are  
NOTE Confidence: 0.8219955

00:16:56.619 --> 00:16:59.726 about 3000 different human EXO proteome,  
NOTE Confidence: 0.8219955

00:16:59.726 --> 00:17:03.487 which means that proteins that are either  
NOTE Confidence: 0.8219955

00:17:03.487 --> 00:17:05.967 extracellular or secreted are included  
NOTE Confidence: 0.8219955

00:17:05.967 --> 00:17:10.060 in the in this East library and each  
NOTE Confidence: 0.8219955

00:17:10.060 --> 00:17:13.090 cell expresses different type of human.  
NOTE Confidence: 0.8219955

00:17:13.090 --> 00:17:16.660 Conditions and when you bind your antibody  
NOTE Confidence: 0.8219955

00:17:16.660 --> 00:17:20.747 to these cells and you can pull down the  
NOTE Confidence: 0.8219955

00:17:20.747 --> 00:17:23.919 cells that are bound by the antibody,  
NOTE Confidence: 0.8219955

00:17:23.920 --> 00:17:26.895 and then you can figure out what  
NOTE Confidence: 0.8219955

00:17:26.895 --> 00:17:29.798 kind of antigen was expressed by  
NOTE Confidence: 0.8219955

00:17:29.798 --> 00:17:32.870 such east by doing deep sequencing.  
NOTE Confidence: 0.8219955

00:17:32.870 --> 00:17:35.859 And this enables doctoring to determine a  
NOTE Confidence: 0.8219955

00:17:35.859 --> 00:17:38.984 wide variety of autoantibodies from a patient

NOTE Confidence: 0.8219955

00:17:38.984 --> 00:17:42.760 in a very high throughput and comprehensive,

NOTE Confidence: 0.8219955

00:17:42.760 --> 00:17:43.752 unbiased manner.

NOTE Confidence: 0.8219955

00:17:43.752 --> 00:17:47.224 So with this his group and we

NOTE Confidence: 0.8219955

00:17:47.224 --> 00:17:49.873 collaborated to look at auto

NOTE Confidence: 0.8219955

00:17:49.873 --> 00:17:51.933 antibodies and COVID-19 patients.

NOTE Confidence: 0.8219955

00:17:51.940 --> 00:17:53.820 These are hospitalized patients

NOTE Confidence: 0.8219955

00:17:53.820 --> 00:17:55.700 who had severe disease.

NOTE Confidence: 0.8219955

00:17:55.700 --> 00:17:57.083 Here moderate disease,

NOTE Confidence: 0.8219955

00:17:57.083 --> 00:17:59.849 mild to asymptomatic who are not

NOTE Confidence: 0.8219955

00:17:59.849 --> 00:18:01.809 hospitalized in negative controls.

NOTE Confidence: 0.8219955

00:18:01.810 --> 00:18:04.160 And the brighter the yellow,

NOTE Confidence: 0.8219955

00:18:04.160 --> 00:18:07.835 the more autoantibody there is in a

NOTE Confidence: 0.8219955

00:18:07.835 --> 00:18:12.039 patient and each patient is a column here.

NOTE Confidence: 0.8219955

00:18:12.040 --> 00:18:14.651 And what we found was quite striking

NOTE Confidence: 0.8219955

00:18:14.651 --> 00:18:17.252 that there are auto antibodies against

NOTE Confidence: 0.8219955

00:18:17.252 --> 00:18:20.060 so many different host proteins over  
NOTE Confidence: 0.8219955

00:18:20.060 --> 00:18:23.292 120 different host proteins are bound  
NOTE Confidence: 0.8219955

00:18:23.292 --> 00:18:25.440 by COVID-19 patients antibodies,  
NOTE Confidence: 0.8219955

00:18:25.440 --> 00:18:27.750 and here particularly prominent are  
NOTE Confidence: 0.8219955

00:18:27.750 --> 00:18:29.598 the antibodies against interference,  
NOTE Confidence: 0.8219955

00:18:29.600 --> 00:18:32.408 which are the very factors that  
NOTE Confidence: 0.8219955

00:18:32.408 --> 00:18:35.238 the host immune responses used to  
NOTE Confidence: 0.8219955

00:18:35.238 --> 00:18:36.990 fight a viral infection.  
NOTE Confidence: 0.8219955

00:18:36.990 --> 00:18:39.714 So obviously if you have auto  
NOTE Confidence: 0.8219955

00:18:39.714 --> 00:18:42.170 antibodies against your own weapon.  
NOTE Confidence: 0.8219955

00:18:42.170 --> 00:18:44.390 Then you cannot deploy those weapons  
NOTE Confidence: 0.8219955

00:18:44.390 --> 00:18:47.089 well to fight a viral infection,  
NOTE Confidence: 0.8219955

00:18:47.090 --> 00:18:49.430 and that's really what's happening in  
NOTE Confidence: 0.8219955

00:18:49.430 --> 00:18:51.804 the severe cobett COVID patients that  
NOTE Confidence: 0.8219955

00:18:51.804 --> 00:18:54.030 these patients are unable to fight  
NOTE Confidence: 0.8219955

00:18:54.030 --> 00:18:56.658 the viral infection because of their

NOTE Confidence: 0.8219955

00:18:56.658 --> 00:18:58.928 autoantibody against the very protein

NOTE Confidence: 0.8219955

00:18:58.928 --> 00:19:01.440 that's needed to combat viral infections.

NOTE Confidence: 0.8219955

00:19:01.440 --> 00:19:03.490 But in addition to these,

NOTE Confidence: 0.8219955

00:19:03.490 --> 00:19:05.950 there are so many other yellow

NOTE Confidence: 0.8219955

00:19:05.950 --> 00:19:07.590 boxes you see here,

NOTE Confidence: 0.8219955

00:19:07.590 --> 00:19:09.895 which are autoantibody against variety

NOTE Confidence: 0.8219955

00:19:09.895 --> 00:19:12.200 of different immune cells themselves.

NOTE Confidence: 0.8219955

00:19:12.200 --> 00:19:14.270 Which is kind of scary,

NOTE Confidence: 0.8219955

00:19:14.270 --> 00:19:16.425 which means that these autoantibodies

NOTE Confidence: 0.8219955

00:19:16.425 --> 00:19:18.580 are actually dampening our own

NOTE Confidence: 0.8219955

00:19:18.649 --> 00:19:20.869 ability to fight a viral infection.

NOTE Confidence: 0.8219955

00:19:20.870 --> 00:19:24.174 Just to give you a couple of examples,

NOTE Confidence: 0.8219955

00:19:24.180 --> 00:19:26.838 this is looking at cumulative autoantibodies

NOTE Confidence: 0.8219955

00:19:26.838 --> 00:19:29.756 that exist in COVID-19 patients and a

NOTE Confidence: 0.8219955

00:19:29.756 --> 00:19:32.255 severe moderate patients who are in the

NOTE Confidence: 0.8219955

00:19:32.330 --> 00:19:34.874 hospital developed a large number of  
NOTE Confidence: 0.8219955

00:19:34.874 --> 00:19:37.606 auto antibodies against all of these  
NOTE Confidence: 0.8219955

00:19:37.606 --> 00:19:40.714 different immune factors and cell types.  
NOTE Confidence: 0.8219955

00:19:40.720 --> 00:19:43.583 And when you look at the functional  
NOTE Confidence: 0.8219955

00:19:43.583 --> 00:19:45.960 consequences of these autoantibodies,  
NOTE Confidence: 0.8219955

00:19:45.960 --> 00:19:48.340 it is quite striking that,  
NOTE Confidence: 0.8219955

00:19:48.340 --> 00:19:49.405 as I mentioned,  
NOTE Confidence: 0.8219955

00:19:49.405 --> 00:19:52.724 the top left box corner that had these  
NOTE Confidence: 0.8219955

00:19:52.724 --> 00:19:54.998 interferon specific autoantibodies.  
NOTE Confidence: 0.8219955

00:19:55.000 --> 00:19:58.276 If you look at those patients ability  
NOTE Confidence: 0.8219955

00:19:58.276 --> 00:20:01.658 to control the viral load over time,  
NOTE Confidence: 0.8219955

00:20:01.660 --> 00:20:04.305 inbred the patients with these  
NOTE Confidence: 0.8219955

00:20:04.305 --> 00:20:05.892 interferon specific autoantibodies  
NOTE Confidence: 0.8219955

00:20:05.892 --> 00:20:08.328 were unable to clear the virus,  
NOTE Confidence: 0.83178055

00:20:08.330 --> 00:20:10.780 whereas those patients without work.  
NOTE Confidence: 0.83178055

00:20:10.780 --> 00:20:13.867 Able to decline in viral load and

NOTE Confidence: 0.83178055

00:20:13.867 --> 00:20:16.530 ultimately control the virus infection.

NOTE Confidence: 0.83178055

00:20:16.530 --> 00:20:17.964 Indicating that these

NOTE Confidence: 0.83178055

00:20:17.964 --> 00:20:20.354 autoantibodies are not only there,

NOTE Confidence: 0.83178055

00:20:20.360 --> 00:20:23.285 but it's functionally impairing our

NOTE Confidence: 0.83178055

00:20:23.285 --> 00:20:27.290 ability to fight a viral infection.

NOTE Confidence: 0.83178055

00:20:27.290 --> 00:20:29.756 And one more example of autoantibody

NOTE Confidence: 0.83178055

00:20:29.756 --> 00:20:31.840 against different immune cell types.

NOTE Confidence: 0.83178055

00:20:31.840 --> 00:20:33.500 So you've probably heard

NOTE Confidence: 0.83178055

00:20:33.500 --> 00:20:35.160 a lot about antibodies.

NOTE Confidence: 0.83178055

00:20:35.160 --> 00:20:36.812 Antibodies are really important

NOTE Confidence: 0.83178055

00:20:36.812 --> 00:20:38.877 to fight a viral infection,

NOTE Confidence: 0.83178055

00:20:38.880 --> 00:20:41.736 and the cell types that produce these

NOTE Confidence: 0.83178055

00:20:41.736 --> 00:20:44.643 antibodies are known as B cells and

NOTE Confidence: 0.83178055

00:20:44.643 --> 00:20:46.648 B cells themselves are absolutely

NOTE Confidence: 0.83178055

00:20:46.648 --> 00:20:48.820 critical for making the antibody.

NOTE Confidence: 0.83178055

00:20:48.820 --> 00:20:51.852 And yet in some people we found that  
NOTE Confidence: 0.83178055

00:20:51.852 --> 00:20:54.164 COVID patients developed an antibody  
NOTE Confidence: 0.83178055

00:20:54.164 --> 00:20:56.624 against the B cells themselves.  
NOTE Confidence: 0.83178055

00:20:56.630 --> 00:20:59.766 So it's like a real like a suicidal  
NOTE Confidence: 0.83178055

00:20:59.766 --> 00:21:02.315 antibody that you know bind to the  
NOTE Confidence: 0.83178055

00:21:02.315 --> 00:21:04.879 B cells and then then kill them.  
NOTE Confidence: 0.83178055

00:21:04.880 --> 00:21:06.760 And these antibodies interesting Lee.  
NOTE Confidence: 0.83178055

00:21:06.760 --> 00:21:09.226 Those people who had these peaceful  
NOTE Confidence: 0.83178055

00:21:09.226 --> 00:21:11.833 specific anybody have very low B cells  
NOTE Confidence: 0.83178055

00:21:11.833 --> 00:21:14.410 as well as inability to mount and a  
NOTE Confidence: 0.83178055

00:21:14.410 --> 00:21:16.510 antibody response against the virus.  
NOTE Confidence: 0.83178055

00:21:16.510 --> 00:21:17.530 So really,  
NOTE Confidence: 0.83178055

00:21:17.530 --> 00:21:19.570 indicating that these autoantibodies  
NOTE Confidence: 0.83178055

00:21:19.570 --> 00:21:22.051 have a impairment induced impairment  
NOTE Confidence: 0.83178055

00:21:22.051 --> 00:21:25.011 in the immune system so that people can  
NOTE Confidence: 0.83178055

00:21:25.011 --> 00:21:27.759 no longer fight the viral infection.

NOTE Confidence: 0.83178055

00:21:27.760 --> 00:21:30.652 And in addition to these immune

NOTE Confidence: 0.83178055

00:21:30.652 --> 00:21:32.580 factors and cell types,

NOTE Confidence: 0.83178055

00:21:32.580 --> 00:21:35.471 we found auto antibodies to a wide

NOTE Confidence: 0.83178055

00:21:35.471 --> 00:21:37.912 range of tissue associated antigens

NOTE Confidence: 0.83178055

00:21:37.912 --> 00:21:41.260 that are in the brain vasculature,

NOTE Confidence: 0.83178055

00:21:41.260 --> 00:21:43.184 connective tissues, cardiac tissues,

NOTE Confidence: 0.83178055

00:21:43.184 --> 00:21:45.344 hepatic tissues, saliva skin,

NOTE Confidence: 0.83178055

00:21:45.344 --> 00:21:48.329 GI tract, and many others.

NOTE Confidence: 0.83178055

00:21:48.330 --> 00:21:51.914 So this really paints a picture of a

NOTE Confidence: 0.83178055

00:21:51.914 --> 00:21:54.549 diverse autoantibody causing all kinds of,

NOTE Confidence: 0.83178055

00:21:54.550 --> 00:21:55.438 you know,

NOTE Confidence: 0.83178055

00:21:55.438 --> 00:21:57.214 immune mediated damage across

NOTE Confidence: 0.83178055

00:21:57.214 --> 00:21:58.990 variety of different organs.

NOTE Confidence: 0.83178055

00:21:58.990 --> 00:22:01.944 And that was my second hypothesis of

NOTE Confidence: 0.83178055

00:22:01.944 --> 00:22:04.758 how along COVID might develop now.

NOTE Confidence: 0.83178055



00:22:04.760 --> 00:22:07.784 These are really patients who had like  
NOTE Confidence: 0.83178055

00:22:07.784 --> 00:22:10.528 severe disease enough to be hospitalised,  
NOTE Confidence: 0.83178055

00:22:10.530 --> 00:22:13.212 so it's not really the typical  
NOTE Confidence: 0.83178055

00:22:13.212 --> 00:22:16.021 loan COVID patients were right now  
NOTE Confidence: 0.83178055

00:22:16.021 --> 00:22:18.823 looking at long COVID patients SERA.  
NOTE Confidence: 0.83178055

00:22:18.830 --> 00:22:21.590 To see if we see a similar kinds  
NOTE Confidence: 0.83178055

00:22:21.590 --> 00:22:24.176 of autoantibodies an if So what the  
NOTE Confidence: 0.83178055

00:22:24.176 --> 00:22:26.001 nature of these autoantibodies are,  
NOTE Confidence: 0.83178055

00:22:26.010 --> 00:22:28.014 you know what kinds of tissue  
NOTE Confidence: 0.83178055

00:22:28.014 --> 00:22:29.960 or antigens are they binding?  
NOTE Confidence: 0.8698312

00:22:32.370 --> 00:22:36.190 So it seems that there is very little that we  
NOTE Confidence: 0.8698312

00:22:36.277 --> 00:22:40.093 can do right now to help long COVID patients.  
NOTE Confidence: 0.8698312

00:22:40.100 --> 00:22:43.316 We don't have a therapy, we don't even  
NOTE Confidence: 0.8698312

00:22:43.316 --> 00:22:46.620 have a great diagnosis for the long COVID.  
NOTE Confidence: 0.8698312

00:22:46.620 --> 00:22:49.497 Finally, the CDC has a guideline for  
NOTE Confidence: 0.8698312

00:22:49.497 --> 00:22:51.909 COVID diagnosis for the long COVID,

NOTE Confidence: 0.8698312

00:22:51.910 --> 00:22:55.490 but there is one kind of ray of hope here

NOTE Confidence: 0.8698312

00:22:55.581 --> 00:22:58.725 because I've been looking and hearing

NOTE Confidence: 0.8698312

00:22:58.725 --> 00:23:02.050 from people on Twitter that patient.

NOTE Confidence: 0.8698312

00:23:02.050 --> 00:23:03.950 Patient based group reporting.

NOTE Confidence: 0.8698312

00:23:03.950 --> 00:23:07.184 About 40% of the long haulers.

NOTE Confidence: 0.8698312

00:23:07.184 --> 00:23:09.468 Feeling better after vaccination.

NOTE Confidence: 0.8698312

00:23:09.470 --> 00:23:11.520 And so, as I mentioned,

NOTE Confidence: 0.8698312

00:23:11.520 --> 00:23:14.088 long COVID may be caused by

NOTE Confidence: 0.8698312

00:23:14.088 --> 00:23:16.955 persistent viral reservoir or and or

NOTE Confidence: 0.8698312

00:23:16.955 --> 00:23:19.107 autoantibody or autoimmune response.

NOTE Confidence: 0.8698312

00:23:19.110 --> 00:23:22.198 And so we think that the vaccine may

NOTE Confidence: 0.8698312

00:23:22.198 --> 00:23:25.108 improve long covered symptom by inducing

NOTE Confidence: 0.8698312

00:23:25.108 --> 00:23:28.186 robust antibodies and T cells against

NOTE Confidence: 0.8698312

00:23:28.265 --> 00:23:30.869 the virus to clear the reservoir.

NOTE Confidence: 0.8698312

00:23:30.870 --> 00:23:34.685 Or it may temporarily sort of suppress

NOTE Confidence: 0.8698312

00:23:34.685 --> 00:23:38.255 the autoreactive cells ability to cause  
NOTE Confidence: 0.8698312

00:23:38.255 --> 00:23:41.325 toxic immunopathology in the patients,  
NOTE Confidence: 0.8698312

00:23:41.330 --> 00:23:45.397 and So what this means is that,  
NOTE Confidence: 0.8698312

00:23:45.400 --> 00:23:49.540 for instance, the M RNA vaccines.  
NOTE Confidence: 0.8698312

00:23:49.540 --> 00:23:52.276 Induce both innate and adaptive immune  
NOTE Confidence: 0.8698312

00:23:52.276 --> 00:23:54.718 responses and the innate immune  
NOTE Confidence: 0.8698312

00:23:54.718 --> 00:23:57.398 response cytokines combined two and  
NOTE Confidence: 0.8698312

00:23:57.398 --> 00:24:00.106 suppress the autoreactive cells and  
NOTE Confidence: 0.8698312

00:24:00.106 --> 00:24:03.016 therefore improve the symptoms or the  
NOTE Confidence: 0.8698312

00:24:03.016 --> 00:24:05.388 adaptive immune responses that are  
NOTE Confidence: 0.8698312

00:24:05.388 --> 00:24:08.112 engaged by the vaccine with antibodies  
NOTE Confidence: 0.8698312

00:24:08.112 --> 00:24:11.551 and T cells that are attacking the  
NOTE Confidence: 0.8698312

00:24:11.551 --> 00:24:14.642 virus of our and controlling the  
NOTE Confidence: 0.8698312

00:24:14.642 --> 00:24:17.427 persistent virus in these patients,  
NOTE Confidence: 0.8698312

00:24:17.430 --> 00:24:21.550 and maybe both of these things are happening.  
NOTE Confidence: 0.8698312

00:24:21.550 --> 00:24:24.080 Depending on what the patients

NOTE Confidence: 0.8698312

00:24:24.080 --> 00:24:27.250 have with respect to long covid.

NOTE Confidence: 0.8698312

00:24:27.250 --> 00:24:31.390 And so we thought that this would be a

NOTE Confidence: 0.8698312

00:24:31.390 --> 00:24:35.593 great place to look into the underlying

NOTE Confidence: 0.8698312

00:24:35.593 --> 00:24:39.435 mechanism along COVID as well as

NOTE Confidence: 0.8698312

00:24:39.435 --> 00:24:43.353 potentially defined therapy against it so.

NOTE Confidence: 0.8698312

00:24:43.360 --> 00:24:46.300 We formed a Yale COVID recovery study

NOTE Confidence: 0.8698312

00:24:46.300 --> 00:24:50.645 and when I say we it's really a superb

NOTE Confidence: 0.8698312

00:24:50.645 --> 00:24:53.754 leadership of Harlan Krumholz and his

NOTE Confidence: 0.8698312

00:24:53.754 --> 00:24:56.314 post grad associate Daisy Massey,

NOTE Confidence: 0.8698312

00:24:56.320 --> 00:24:58.720 who really put this forward.

NOTE Confidence: 0.8698312

00:24:58.720 --> 00:25:01.960 And now we have a study up and

NOTE Confidence: 0.8698312

00:25:01.960 --> 00:25:04.931 running where we are recruiting among

NOTE Confidence: 0.8698312

00:25:04.931 --> 00:25:08.027 COVID patients with who have not

NOTE Confidence: 0.8698312

00:25:08.120 --> 00:25:10.240 gotten the vaccine yet,

NOTE Confidence: 0.8698312

00:25:10.240 --> 00:25:12.100 and then we're following

NOTE Confidence: 0.8698312

00:25:12.100 --> 00:25:13.960 their immune response overtime  
NOTE Confidence: 0.8698312

00:25:13.960 --> 00:25:16.230 after they become vaccinated.  
NOTE Confidence: 0.8698312

00:25:16.230 --> 00:25:19.776 To see what kind of changes occur in the  
NOTE Confidence: 0.8698312

00:25:19.776 --> 00:25:23.068 immune response in the long haulers and  
NOTE Confidence: 0.8698312

00:25:23.068 --> 00:25:26.058 what those changes mean with respect  
NOTE Confidence: 0.8698312

00:25:26.058 --> 00:25:29.136 to their recovery from the symptoms.  
NOTE Confidence: 0.8698312

00:25:29.140 --> 00:25:32.612 And this is again of a large  
NOTE Confidence: 0.8698312

00:25:32.612 --> 00:25:35.128 collaboration between Charles de la Cruz,  
NOTE Confidence: 0.8698312

00:25:35.130 --> 00:25:36.890 Natalie Lambert Arm Ring,  
NOTE Confidence: 0.8698312

00:25:36.890 --> 00:25:39.530 who I already mentioned is the  
NOTE Confidence: 0.8698312

00:25:39.612 --> 00:25:42.047 creator of the Reed technology.  
NOTE Confidence: 0.8698312

00:25:42.050 --> 00:25:45.431 Erica spots as well as these other  
NOTE Confidence: 0.8698312

00:25:45.431 --> 00:25:47.850 younger investigators who are really.  
NOTE Confidence: 0.8698312

00:25:47.850 --> 00:25:49.275 Recruiting and consenting  
NOTE Confidence: 0.8698312

00:25:49.275 --> 00:25:51.175 and studying the patients.  
NOTE Confidence: 0.8698312

00:25:51.180 --> 00:25:54.564 And so I'm very fortunate to be involved

NOTE Confidence: 0.8698312

00:25:54.564 --> 00:25:57.744 in this large group who are really

NOTE Confidence: 0.8698312

00:25:57.744 --> 00:26:01.157 looking at the impact of vaccine on

NOTE Confidence: 0.8698312

00:26:01.157 --> 00:26:04.379 long hauler with respect to every

NOTE Confidence: 0.8698312

00:26:04.379 --> 00:26:07.364 immune parameter that you can imagine,

NOTE Confidence: 0.8698312

00:26:07.364 --> 00:26:10.220 we're throwing everything at this disease.

NOTE Confidence: 0.8698312

00:26:10.220 --> 00:26:13.235 Whatever the cutting edge technology

NOTE Confidence: 0.8698312

00:26:13.235 --> 00:26:15.647 we have on hand.

NOTE Confidence: 0.8698312

00:26:15.650 --> 00:26:18.639 So the mission is really to understand

NOTE Confidence: 0.8698312

00:26:18.639 --> 00:26:20.380 the immunological determinant of

NOTE Confidence: 0.8698312

00:26:20.380 --> 00:26:22.365 disease pathogenesis of long COVID.

NOTE Confidence: 0.8698312

00:26:22.370 --> 00:26:24.890 In order to inform rational therapy.

NOTE Confidence: 0.8698312

00:26:24.890 --> 00:26:28.130 And we're very excited to to

NOTE Confidence: 0.8698312

00:26:28.130 --> 00:26:31.210 carry on with this effort.

NOTE Confidence: 0.8698312

00:26:31.210 --> 00:26:33.070 So I want to acknowledge

NOTE Confidence: 0.8698312

00:26:33.070 --> 00:26:34.930 the number of people here.

NOTE Confidence: 0.8404231

00:26:34.930 --> 00:26:37.274 First of all, I was able to only  
NOTE Confidence: 0.8404231

00:26:37.274 --> 00:26:39.577 discuss a little bit of our research  
NOTE Confidence: 0.8404231

00:26:39.577 --> 00:26:42.815 today that has to do with the diverse  
NOTE Confidence: 0.8404231

00:26:42.815 --> 00:26:45.350 autoantibodies in patients with COVID-19.  
NOTE Confidence: 0.8404231

00:26:45.350 --> 00:26:47.798 But I also mentioned some of the misfiring  
NOTE Confidence: 0.8404231

00:26:47.798 --> 00:26:49.769 of the immunological responses that  
NOTE Confidence: 0.8404231

00:26:49.769 --> 00:26:52.786 happen in severe COVID with fatal COVID.  
NOTE Confidence: 0.8404231

00:26:52.790 --> 00:26:55.387 I also mentioned there's a delay in  
NOTE Confidence: 0.8404231

00:26:55.387 --> 00:26:57.285 the neutralizing antibody titer and  
NOTE Confidence: 0.8404231

00:26:57.285 --> 00:26:59.080 then sex differences in immunity  
NOTE Confidence: 0.8404231

00:26:59.080 --> 00:27:00.710 that I mentioned earlier.  
NOTE Confidence: 0.8404231

00:27:00.710 --> 00:27:03.910 And these are the are the real heroes.  
NOTE Confidence: 0.8404231

00:27:03.910 --> 00:27:05.910 They're the ones that really  
NOTE Confidence: 0.8404231

00:27:05.910 --> 00:27:07.510 carried out the study.  
NOTE Confidence: 0.8404231

00:27:07.510 --> 00:27:09.827 The names are listed here and my  
NOTE Confidence: 0.8404231

00:27:09.827 --> 00:27:12.299 lab members who have been absolutely

NOTE Confidence: 0.8404231  
00:27:12.299 --> 00:27:15.107 amazing over the entire pandemic period,  
NOTE Confidence: 0.8404231  
00:27:15.110 --> 00:27:17.910 not only looking at the immune responses,  
NOTE Confidence: 0.8404231  
00:27:17.910 --> 00:27:20.028 but also creating an animal model  
NOTE Confidence: 0.8404231  
00:27:20.028 --> 00:27:22.860 to study COVID as well as really  
NOTE Confidence: 0.8404231  
00:27:22.860 --> 00:27:25.110 getting involved in the surveillance.  
NOTE Confidence: 0.8404231  
00:27:25.110 --> 00:27:27.564 The PCR testing for the health  
NOTE Confidence: 0.8404231  
00:27:27.564 --> 00:27:30.072 care workers which were able to  
NOTE Confidence: 0.8404231  
00:27:30.072 --> 00:27:32.454 pick up some early exposure cases.  
NOTE Confidence: 0.8404231  
00:27:32.460 --> 00:27:35.288 Back in the spring of last year,  
NOTE Confidence: 0.8404231  
00:27:35.290 --> 00:27:37.190 when testing was quite limited  
NOTE Confidence: 0.8404231  
00:27:37.190 --> 00:27:39.877 and this entire set of work that  
NOTE Confidence: 0.8404231  
00:27:39.877 --> 00:27:42.383 are listed here is enabled by the  
NOTE Confidence: 0.8404231  
00:27:42.383 --> 00:27:44.180 impact deal BIOREPOSITORY,  
NOTE Confidence: 0.8404231  
00:27:44.180 --> 00:27:47.180 which is run by Doctor Albert Co at  
NOTE Confidence: 0.8404231  
00:27:47.180 --> 00:27:49.712 the school public health as well  
NOTE Confidence: 0.8404231



00:27:49.712 --> 00:27:52.256 as all the others listed here.  
NOTE Confidence: 0.8404231

00:27:52.260 --> 00:27:55.332 And I want to thank the funders for  
NOTE Confidence: 0.8404231

00:27:55.332 --> 00:27:58.316 allowing us to carry on this research,  
NOTE Confidence: 0.8404231

00:27:58.320 --> 00:28:00.826 so I'm going to stop sharing here  
NOTE Confidence: 0.8404231

00:28:00.826 --> 00:28:02.760 and take any questions.  
NOTE Confidence: 0.7615253

00:28:14.510 --> 00:28:15.650 Still no.  
NOTE Confidence: 0.83940935

00:28:21.100 --> 00:28:23.074 OK, can you hear me now?  
NOTE Confidence: 0.83940935

00:28:23.074 --> 00:28:25.302 Yes yes wonderful ekigho sorry everybody.  
NOTE Confidence: 0.83940935

00:28:25.302 --> 00:28:27.267 We're having some technical difficulties  
NOTE Confidence: 0.83940935

00:28:27.267 --> 00:28:29.647 on my end so thank you for your patience.  
NOTE Confidence: 0.83940935

00:28:29.650 --> 00:28:30.310 Wonderful presentation.  
NOTE Confidence: 0.83940935

00:28:30.310 --> 00:28:31.960 Thank you very very much.  
NOTE Confidence: 0.83940935

00:28:31.960 --> 00:28:34.389 This is just extraordinary work and I  
NOTE Confidence: 0.83940935

00:28:34.389 --> 00:28:36.558 appreciate you giving kudos to the team.  
NOTE Confidence: 0.83940935

00:28:36.560 --> 00:28:37.888 'cause as everyone knows,  
NOTE Confidence: 0.83940935

00:28:37.888 --> 00:28:40.584 this is a true team partnership and we're

NOTE Confidence: 0.83940935

00:28:40.584 --> 00:28:42.810 so excited that you're leading the way.

NOTE Confidence: 0.83940935

00:28:42.810 --> 00:28:45.314 I am actually shocked to see that we

NOTE Confidence: 0.83940935

00:28:45.314 --> 00:28:47.749 don't have any questions in the chat.

NOTE Confidence: 0.83940935

00:28:47.750 --> 00:28:49.718 So please, I know this group.

NOTE Confidence: 0.83940935

00:28:49.720 --> 00:28:52.440 This is not a shy group of alumni.

NOTE Confidence: 0.83940935

00:28:52.440 --> 00:28:53.815 Submit your questions and luckily

NOTE Confidence: 0.83940935

00:28:53.815 --> 00:28:55.749 we did have a couple people submit

NOTE Confidence: 0.83940935

00:28:55.749 --> 00:28:57.749 to me just a few days prior because

NOTE Confidence: 0.83940935

00:28:57.803 --> 00:28:59.585 they were so excited they couldn't.

NOTE Confidence: 0.83940935

00:28:59.590 --> 00:29:01.473 They couldn't wait to ask you, Akiko.

NOTE Confidence: 0.83940935

00:29:01.473 --> 00:29:03.570 So let me let me jump right in with

NOTE Confidence: 0.83940935

00:29:03.635 --> 00:29:05.639 some of our pre submitted questions.

NOTE Confidence: 0.83940935

00:29:05.640 --> 00:29:07.704 The first is why do you think women

NOTE Confidence: 0.83940935

00:29:07.704 --> 00:29:10.038 are more at risk of getting lung COVID?

NOTE Confidence: 0.85460174

00:29:11.000 --> 00:29:13.961 Yeah, so that's a very interesting question

NOTE Confidence: 0.85460174

00:29:13.961 --> 00:29:17.647 because as I mentioned in the seminar there,  
NOTE Confidence: 0.85460174

00:29:17.650 --> 00:29:20.404 the demographic for the long COVID  
NOTE Confidence: 0.85460174

00:29:20.404 --> 00:29:23.651 is quite distinct from what we see  
NOTE Confidence: 0.85460174

00:29:23.651 --> 00:29:25.866 with the hospitalized patients who  
NOTE Confidence: 0.85460174

00:29:25.866 --> 00:29:29.292 are much older and males are more at  
NOTE Confidence: 0.85460174

00:29:29.292 --> 00:29:31.920 risk for severe disease with COVID,  
NOTE Confidence: 0.85460174

00:29:31.920 --> 00:29:35.350 whereas the long Cove it is really  
NOTE Confidence: 0.85460174

00:29:35.350 --> 00:29:38.988 dominated by younger women 30 to 50 year  
NOTE Confidence: 0.85460174

00:29:38.988 --> 00:29:41.880 old there dominated in that group so.  
NOTE Confidence: 0.85460174

00:29:41.880 --> 00:29:44.268 There are a couple of reasons  
NOTE Confidence: 0.85460174

00:29:44.268 --> 00:29:45.860 why this might be.  
NOTE Confidence: 0.85460174

00:29:45.860 --> 00:29:48.248 One is what I alluded to,  
NOTE Confidence: 0.85460174

00:29:48.250 --> 00:29:50.497 which is this group of women are  
NOTE Confidence: 0.85460174

00:29:50.497 --> 00:29:52.990 also a high risk for developing  
NOTE Confidence: 0.85460174

00:29:52.990 --> 00:29:55.410 autoimmune disease such as lupus,  
NOTE Confidence: 0.85460174

00:29:55.410 --> 00:29:56.950 arthritis and many others,

NOTE Confidence: 0.85460174

00:29:56.950 --> 00:29:59.746 and so if that's the group that's

NOTE Confidence: 0.85460174

00:29:59.746 --> 00:30:02.176 sort of developing a long COVID,

NOTE Confidence: 0.85460174

00:30:02.180 --> 00:30:03.908 it's potentially possible that

NOTE Confidence: 0.85460174

00:30:03.908 --> 00:30:06.500 the autoimmune disease is the 2nd

NOTE Confidence: 0.85460174

00:30:06.577 --> 00:30:09.223 hypothesis that I have about long COVID

NOTE Confidence: 0.85460174

00:30:09.223 --> 00:30:11.650 may be happening in those patients.

NOTE Confidence: 0.85460174

00:30:11.650 --> 00:30:14.282 In that you know they they were sort

NOTE Confidence: 0.85460174

00:30:14.282 --> 00:30:16.989 of prone to developing autoimmunity.

NOTE Confidence: 0.85460174

00:30:16.990 --> 00:30:19.078 But this virus kind of tipped

NOTE Confidence: 0.85460174

00:30:19.078 --> 00:30:21.067 the balance forward to developing

NOTE Confidence: 0.85460174

00:30:21.067 --> 00:30:23.159 a severe autoimmune disease,

NOTE Confidence: 0.85460174

00:30:23.160 --> 00:30:26.216 in which in which case you know they

NOTE Confidence: 0.85460174

00:30:26.216 --> 00:30:28.224 developped these autoantibody to variety

NOTE Confidence: 0.85460174

00:30:28.224 --> 00:30:31.495 of cell types in you know that may

NOTE Confidence: 0.85460174

00:30:31.495 --> 00:30:33.840 be causing these multiple symptoms.

NOTE Confidence: 0.85460174

00:30:33.840 --> 00:30:35.668 So that's one hypothesis.  
NOTE Confidence: 0.85460174

00:30:35.668 --> 00:30:39.457 There may also be some you know factors  
NOTE Confidence: 0.85460174

00:30:39.457 --> 00:30:42.803 that are related to sex hormones or.  
NOTE Confidence: 0.85460174

00:30:42.810 --> 00:30:44.740 Other issues that we haven't  
NOTE Confidence: 0.85460174

00:30:44.740 --> 00:30:46.670 been able to tackle yet,  
NOTE Confidence: 0.85460174

00:30:46.670 --> 00:30:49.758 which may be also happening in this group.  
NOTE Confidence: 0.82806945

00:30:50.610 --> 00:30:52.927 OK, great, thank you and the second  
NOTE Confidence: 0.82806945

00:30:52.927 --> 00:30:55.366 question is do people who are severely  
NOTE Confidence: 0.82806945

00:30:55.366 --> 00:30:57.900 ill from COVID also get lung COVID?  
NOTE Confidence: 0.843374

00:30:58.700 --> 00:31:00.950 Yeah, that's a really good question.  
NOTE Confidence: 0.843374

00:31:00.950 --> 00:31:03.678 In fact, as I mentioned that the percentage  
NOTE Confidence: 0.843374

00:31:03.678 --> 00:31:06.537 of long haul or disease really differ  
NOTE Confidence: 0.843374

00:31:06.537 --> 00:31:09.066 between different studies and one of  
NOTE Confidence: 0.843374

00:31:09.066 --> 00:31:11.154 the key differences in these studies  
NOTE Confidence: 0.843374

00:31:11.154 --> 00:31:13.700 is that when you follow patients who  
NOTE Confidence: 0.843374

00:31:13.700 --> 00:31:15.950 were sick enough to be hospitalized,

NOTE Confidence: 0.843374

00:31:15.950 --> 00:31:18.578 and some of them got, you know,

NOTE Confidence: 0.843374

00:31:18.578 --> 00:31:20.448 mechanical ventilation and so on.

NOTE Confidence: 0.843374

00:31:20.450 --> 00:31:22.949 These sort of the patients who sustained

NOTE Confidence: 0.843374

00:31:22.949 --> 00:31:25.330 lung damage in other organ damage,

NOTE Confidence: 0.843374

00:31:25.330 --> 00:31:27.634 which tend to be very long

NOTE Confidence: 0.843374

00:31:27.634 --> 00:31:28.786 lasting because it's.

NOTE Confidence: 0.843374

00:31:28.790 --> 00:31:31.088 Really hard to repair these tissues,

NOTE Confidence: 0.843374

00:31:31.090 --> 00:31:32.855 especially because these people are

NOTE Confidence: 0.843374

00:31:32.855 --> 00:31:35.923 also in the older age group whose repair

NOTE Confidence: 0.843374

00:31:35.923 --> 00:31:37.978 functions have declined over time.

NOTE Confidence: 0.843374

00:31:37.980 --> 00:31:41.044 So you know if you ask these people,

NOTE Confidence: 0.843374

00:31:41.050 --> 00:31:43.336 do you still have lingering symptoms?

NOTE Confidence: 0.843374

00:31:43.340 --> 00:31:44.876 The answer is vast.

NOTE Confidence: 0.843374

00:31:44.876 --> 00:31:47.558 Majority is yes, so about 70 percent.

NOTE Confidence: 0.843374

00:31:47.558 --> 00:31:50.010 75% of people who've had sort of

NOTE Confidence: 0.843374

00:31:50.010 --> 00:31:52.540 severe enough COVID to be hospitalized.

NOTE Confidence: 0.843374

00:31:52.540 --> 00:31:54.450 They still have lingering symptoms.

NOTE Confidence: 0.843374

00:31:54.450 --> 00:31:56.748 That's different from what we're calling

NOTE Confidence: 0.843374

00:31:56.748 --> 00:31:59.400 a long COVID, which is people with.

NOTE Confidence: 0.843374

00:31:59.400 --> 00:32:01.275 Milder disease who are never

NOTE Confidence: 0.843374

00:32:01.275 --> 00:32:03.199 hospitalized who are developing these?

NOTE Confidence: 0.843374

00:32:03.200 --> 00:32:04.000 You know,

NOTE Confidence: 0.843374

00:32:04.000 --> 00:32:06.400 very long term symptom after either

NOTE Confidence: 0.843374

00:32:06.400 --> 00:32:08.241 asymptomatic or mild infection and

NOTE Confidence: 0.843374

00:32:08.241 --> 00:32:10.936 that tends to be the the group that

NOTE Confidence: 0.843374

00:32:10.936 --> 00:32:13.186 is more dominated by younger women.

NOTE Confidence: 0.843374

00:32:13.190 --> 00:32:16.150 And so I think the Long Cove it.

NOTE Confidence: 0.843374

00:32:16.150 --> 00:32:18.370 It's easy to kind of bunch

NOTE Confidence: 0.843374

00:32:18.370 --> 00:32:19.850 everything into one basket,

NOTE Confidence: 0.843374

00:32:19.850 --> 00:32:22.447 but it in terms of pathogenesis we

NOTE Confidence: 0.843374

00:32:22.447 --> 00:32:24.754 really need to separate these groups

NOTE Confidence: 0.843374

00:32:24.754 --> 00:32:28.239 and so I would say that the long Cove

NOTE Confidence: 0.843374

00:32:28.239 --> 00:32:31.067 it is really referring to this milder.

NOTE Confidence: 0.843374

00:32:31.070 --> 00:32:32.466 Infection that's causing long

NOTE Confidence: 0.843374

00:32:32.466 --> 00:32:34.560 term symptom as opposed to the

NOTE Confidence: 0.843374

00:32:34.627 --> 00:32:36.462 hospitalized patients who are still

NOTE Confidence: 0.843374

00:32:36.462 --> 00:32:38.699 feeling ill from the damage that

NOTE Confidence: 0.843374

00:32:38.699 --> 00:32:40.399 they sustained from the COVID.

NOTE Confidence: 0.843374

00:32:40.400 --> 00:32:42.920 So I hope that answers that question.

NOTE Confidence: 0.8416212

00:32:43.530 --> 00:32:45.156 Absolutely thank you through all answer.

NOTE Confidence: 0.8416212

00:32:45.160 --> 00:32:47.008 So we are starting to get some

NOTE Confidence: 0.8416212

00:32:47.008 --> 00:32:49.283 questions in the chat, which is great.

NOTE Confidence: 0.8416212

00:32:49.283 --> 00:32:51.950 I'm going to send the first one

NOTE Confidence: 0.8416212

00:32:52.040 --> 00:32:54.532 over to you and. Read it verbatim.

NOTE Confidence: 0.8416212

00:32:54.532 --> 00:32:56.136 So given autoimmunity likely

NOTE Confidence: 0.8416212

00:32:56.136 --> 00:32:58.500 plays an important role in the

NOTE Confidence: 0.8416212



00:32:58.500 --> 00:32:59.896 pathogenesis of long COVID,  
NOTE Confidence: 0.8416212

00:32:59.900 --> 00:33:02.116 I want to find out if these patients  
NOTE Confidence: 0.8416212

00:33:02.116 --> 00:33:04.093 have an increased prevalence of  
NOTE Confidence: 0.8416212

00:33:04.093 --> 00:33:06.358 family history or personal history  
NOTE Confidence: 0.8416212

00:33:06.358 --> 00:33:08.780 of autoimmune diseases like collagen,  
NOTE Confidence: 0.8416212

00:33:08.780 --> 00:33:09.935 vascular disease preceding  
NOTE Confidence: 0.8416212

00:33:09.935 --> 00:33:11.475 the diagnosis of COVID-19.  
NOTE Confidence: 0.86512786

00:33:12.610 --> 00:33:14.760 Yeah, that's an excellent question,  
NOTE Confidence: 0.86512786

00:33:14.760 --> 00:33:17.472 so I'm not sure how much the kind  
NOTE Confidence: 0.86512786

00:33:17.472 --> 00:33:19.230 of inherited susceptibility to  
NOTE Confidence: 0.86512786

00:33:19.230 --> 00:33:21.735 autoimmune diseases were known in  
NOTE Confidence: 0.86512786

00:33:21.735 --> 00:33:25.055 the long haulers right now we are  
NOTE Confidence: 0.86512786

00:33:25.055 --> 00:33:27.225 collecting this kind of information.  
NOTE Confidence: 0.86512786

00:33:27.230 --> 00:33:29.678 First. We have this very extensive  
NOTE Confidence: 0.86512786

00:33:29.678 --> 00:33:31.960 survey of symptoms and history.  
NOTE Confidence: 0.86512786

00:33:31.960 --> 00:33:34.528 You know whether they've had any

NOTE Confidence: 0.86512786

00:33:34.528 --> 00:33:36.690 autoimmune disease in the past,

NOTE Confidence: 0.86512786

00:33:36.690 --> 00:33:39.700 what kind of medications they were giving,

NOTE Confidence: 0.86512786

00:33:39.700 --> 00:33:43.214 so we should be able to collect

NOTE Confidence: 0.86512786

00:33:43.214 --> 00:33:44.720 some of these.

NOTE Confidence: 0.86512786

00:33:44.720 --> 00:33:45.650 Important information soon,

NOTE Confidence: 0.86512786

00:33:45.650 --> 00:33:47.200 but obviously our family history

NOTE Confidence: 0.86512786

00:33:47.200 --> 00:33:49.258 of all the different diseases that's,

NOTE Confidence: 0.86512786

00:33:49.260 --> 00:33:51.430 I think the next next step we're

NOTE Confidence: 0.86512786

00:33:51.430 --> 00:33:53.756 going to have to reach out to

NOTE Confidence: 0.86512786

00:33:53.756 --> 00:33:55.406 these patients and find out.

NOTE Confidence: 0.867803

00:33:56.240 --> 00:33:57.266 Great, thank you.

NOTE Confidence: 0.867803

00:33:57.266 --> 00:33:59.660 The next question is has the REACH

NOTE Confidence: 0.867803

00:33:59.727 --> 00:34:01.632 technology been applied to other

NOTE Confidence: 0.867803

00:34:01.632 --> 00:34:04.318 viral illnesses and if So what sort

NOTE Confidence: 0.867803

00:34:04.318 --> 00:34:06.448 of differences in number and or

NOTE Confidence: 0.867803

00:34:06.448 --> 00:34:08.249 diversity of responses are seen?  
NOTE Confidence: 0.8348238

00:34:09.220 --> 00:34:11.530 Yeah, another very excellent question,  
NOTE Confidence: 0.8348238

00:34:11.530 --> 00:34:15.149 so we don't think that COVID is  
NOTE Confidence: 0.8348238

00:34:15.149 --> 00:34:17.979 alone in inducing these types  
NOTE Confidence: 0.8348238

00:34:17.979 --> 00:34:20.914 of auto mean oldani bodies.  
NOTE Confidence: 0.8348238

00:34:20.920 --> 00:34:23.836 So we are currently testing or in the in  
NOTE Confidence: 0.8348238

00:34:23.836 --> 00:34:27.228 the midst of planning a test for other  
NOTE Confidence: 0.8348238

00:34:27.228 --> 00:34:29.707 acute respiratory viral infections and  
NOTE Confidence: 0.8348238

00:34:29.707 --> 00:34:32.497 potentially other types of infections,  
NOTE Confidence: 0.8348238

00:34:32.500 --> 00:34:35.510 so we don't know the answer yet.  
NOTE Confidence: 0.8348238

00:34:35.510 --> 00:34:38.078 This brief technology is quite knew.  
NOTE Confidence: 0.8348238

00:34:38.080 --> 00:34:40.220 It's really the first of  
NOTE Confidence: 0.8348238

00:34:40.220 --> 00:34:41.932 many application was kovid,  
NOTE Confidence: 0.8348238

00:34:41.940 --> 00:34:45.468 but I believe Doctor Ring is going to be  
NOTE Confidence: 0.8348238

00:34:45.468 --> 00:34:48.380 expanding his analysis to other diseases,  
NOTE Confidence: 0.8348238

00:34:48.380 --> 00:34:52.358 and in fact he has done reap analysis of.

NOTE Confidence: 0.8348238

00:34:52.360 --> 00:34:53.710 Known autoimmune diseases

NOTE Confidence: 0.8348238

00:34:53.710 --> 00:34:55.960 and have found that lupus,

NOTE Confidence: 0.8348238

00:34:55.960 --> 00:34:58.756 the diversity of antibodies that are

NOTE Confidence: 0.8348238

00:34:58.756 --> 00:35:01.810 found in COVID exceeds that of lupus,

NOTE Confidence: 0.8348238

00:35:01.810 --> 00:35:05.074 so it's really kind of a remarkable picture

NOTE Confidence: 0.8348238

00:35:05.074 --> 00:35:08.110 of autoimmune activation happening in Kovan,

NOTE Confidence: 0.8348238

00:35:08.110 --> 00:35:09.910 and whether that happens

NOTE Confidence: 0.8348238

00:35:09.910 --> 00:35:12.160 after flu infection and virus.

NOTE Confidence: 0.8348238

00:35:12.160 --> 00:35:14.410 Other kind of viral infection.

NOTE Confidence: 0.8348238

00:35:14.410 --> 00:35:17.343 We are really in the midst of

NOTE Confidence: 0.8348238

00:35:17.343 --> 00:35:19.809 doing this kind of research.

NOTE Confidence: 0.8348238

00:35:19.810 --> 00:35:20.710 Great, thank

NOTE Confidence: 0.8067941

00:35:20.710 --> 00:35:24.160 you so the next one is.

NOTE Confidence: 0.8067941

00:35:24.160 --> 00:35:25.725 Are there any emerging therapies

NOTE Confidence: 0.8067941

00:35:25.725 --> 00:35:26.977 that show early promise?

NOTE Confidence: 0.83408064

00:35:28.160 --> 00:35:30.792 Yeah, so the only only glimpse we  
NOTE Confidence: 0.83408064

00:35:30.792 --> 00:35:33.350 have of anything helping long COVID  
NOTE Confidence: 0.83408064

00:35:33.350 --> 00:35:36.056 really appears to be this vaccines.  
NOTE Confidence: 0.83408064

00:35:36.060 --> 00:35:38.755 There are other anecdotal reportes of people  
NOTE Confidence: 0.83408064

00:35:38.755 --> 00:35:41.060 feeling better with other medications.  
NOTE Confidence: 0.83408064

00:35:41.060 --> 00:35:43.664 I you know we don't have enough  
NOTE Confidence: 0.83408064

00:35:43.664 --> 00:35:45.789 number to conclude what other  
NOTE Confidence: 0.83408064

00:35:45.789 --> 00:35:48.124 therapies might be working there.  
NOTE Confidence: 0.83408064

00:35:48.130 --> 00:35:51.594 There may be some clinical trials that are  
NOTE Confidence: 0.83408064

00:35:51.594 --> 00:35:54.369 ongoing that's going to inform us soon,  
NOTE Confidence: 0.83408064

00:35:54.370 --> 00:35:57.674 but this is an important question because.  
NOTE Confidence: 0.83408064

00:35:57.680 --> 00:36:00.038 You know, depending on the hypothesis,  
NOTE Confidence: 0.83408064

00:36:00.040 --> 00:36:02.005 if the reservoir the viral  
NOTE Confidence: 0.83408064

00:36:02.005 --> 00:36:03.970 reservoir is causing long COVID,  
NOTE Confidence: 0.83408064

00:36:03.970 --> 00:36:07.106 we really need to go after that virus,  
NOTE Confidence: 0.83408064

00:36:07.110 --> 00:36:10.046 which means we can treat these patients with

NOTE Confidence: 0.83408064

00:36:10.046 --> 00:36:12.219 monoclonal antibody cocktails or antivirals.

NOTE Confidence: 0.83408064

00:36:12.220 --> 00:36:15.364 Or, you know, fear on something like that.

NOTE Confidence: 0.83408064

00:36:15.370 --> 00:36:17.330 They really get the virus,

NOTE Confidence: 0.83408064

00:36:17.330 --> 00:36:19.688 whereas if it's really caused by,

NOTE Confidence: 0.83408064

00:36:19.690 --> 00:36:21.086 you know autoimmune disease,

NOTE Confidence: 0.83408064

00:36:21.086 --> 00:36:23.180 then we really need to be

NOTE Confidence: 0.83408064

00:36:23.249 --> 00:36:25.189 dampening the immune response.

NOTE Confidence: 0.83408064

00:36:25.190 --> 00:36:27.626 So therapies that are used in

NOTE Confidence: 0.83408064

00:36:27.626 --> 00:36:29.979 autoimmune diseases can be used for.

NOTE Confidence: 0.83408064

00:36:29.980 --> 00:36:32.479 More COVID may be potentially more targeted.

NOTE Confidence: 0.83408064

00:36:32.480 --> 00:36:35.264 Approach can be developed based on what kind

NOTE Confidence: 0.83408064

00:36:35.264 --> 00:36:37.479 of autoantigens that they were detecting,

NOTE Confidence: 0.83408064

00:36:37.480 --> 00:36:39.442 so there's a lot of different

NOTE Confidence: 0.83408064

00:36:39.442 --> 00:36:41.400 ways to go about therapy,

NOTE Confidence: 0.83408064

00:36:41.400 --> 00:36:44.432 but we really need to know the disease

NOTE Confidence: 0.83408064

00:36:44.432 --> 00:36:46.757 pathogenesis before we can engage in those.

NOTE Confidence: 0.8304333

00:36:47.450 --> 00:36:50.138 I thank you for the next writer.

NOTE Confidence: 0.8304333

00:36:50.140 --> 00:36:52.828 Has had two doses of the Pfizer

NOTE Confidence: 0.8304333

00:36:52.828 --> 00:36:55.162 vaccine and lives in Georgia and

NOTE Confidence: 0.8304333

00:36:55.162 --> 00:36:57.738 is reluctant to go out in public

NOTE Confidence: 0.8304333

00:36:57.820 --> 00:37:00.124 and was wondering if you could

NOTE Confidence: 0.8304333

00:37:00.124 --> 00:37:02.416 speak to is anyone working on

NOTE Confidence: 0.8304333

00:37:02.416 --> 00:37:03.928 neutralizing antibodies and antibody

NOTE Confidence: 0.8304333

00:37:03.928 --> 00:37:06.270 test or CMI test for vaccines?

NOTE Confidence: 0.8304333

00:37:06.270 --> 00:37:08.568 He's a little concerned about the

NOTE Confidence: 0.8304333

00:37:08.570 --> 00:37:09.336 neutralizing antibodies

NOTE Confidence: 0.8304333

00:37:09.336 --> 00:37:10.868 or cell mediated immunity.

NOTE Confidence: 0.8304333

00:37:10.870 --> 00:37:12.790 Yeah, that's also a common,

NOTE Confidence: 0.8304333

00:37:12.790 --> 00:37:15.106 you know concern that people even

NOTE Confidence: 0.8304333

00:37:15.106 --> 00:37:17.460 though they got the two doses.

NOTE Confidence: 0.8304333

00:37:17.460 --> 00:37:19.348 There are rare cases,

NOTE Confidence: 0.8304333

00:37:19.348 --> 00:37:21.708 a breakthrough infection that happen,

NOTE Confidence: 0.8304333

00:37:21.710 --> 00:37:24.070 and that's with all vaccines.

NOTE Confidence: 0.8304333

00:37:24.070 --> 00:37:24.520 Fortunately,

NOTE Confidence: 0.8304333

00:37:24.520 --> 00:37:28.120 the M RNA vaccines like the Pfizer one

NOTE Confidence: 0.8304333

00:37:28.120 --> 00:37:31.146 that the question or just indicated.

NOTE Confidence: 0.8304333

00:37:31.150 --> 00:37:33.982 I have really high efficacy and

NOTE Confidence: 0.8304333

00:37:33.982 --> 00:37:35.398 effectiveness against infection,

NOTE Confidence: 0.8304333

00:37:35.400 --> 00:37:37.760 so that's really great news,

NOTE Confidence: 0.8304333

00:37:37.760 --> 00:37:39.920 but the breakthrough does occur

NOTE Confidence: 0.8304333

00:37:39.920 --> 00:37:42.654 in rare cases and we don't

NOTE Confidence: 0.8304333

00:37:42.654 --> 00:37:45.546 know why some people with fully

NOTE Confidence: 0.8304333

00:37:45.546 --> 00:37:47.750 vaccinate status are getting.

NOTE Confidence: 0.8304333

00:37:47.750 --> 00:37:48.410 Infected again,

NOTE Confidence: 0.8304333

00:37:48.410 --> 00:37:51.050 it could be that there there was an

NOTE Confidence: 0.8304333

00:37:51.122 --> 00:37:54.038 underlying immune deficiency in these people,

NOTE Confidence: 0.8304333



00:37:54.040 --> 00:37:56.704 or it could be that they got exposed to  
NOTE Confidence: 0.8304333

00:37:56.704 --> 00:37:59.683 a variant that you know wasn't quite  
NOTE Confidence: 0.8304333

00:37:59.683 --> 00:38:02.290 well neutralized by their antibodies,  
NOTE Confidence: 0.8304333

00:38:02.290 --> 00:38:05.434 and so I agree with this person 100%.  
NOTE Confidence: 0.8304333

00:38:05.440 --> 00:38:08.576 I think we need a neutralizing antibody test.  
NOTE Confidence: 0.8304333

00:38:08.580 --> 00:38:11.724 It's right now to do this with the  
NOTE Confidence: 0.8304333

00:38:11.724 --> 00:38:14.082 real virus. It's a huge endeavor.  
NOTE Confidence: 0.8304333

00:38:14.082 --> 00:38:16.440 We do this in the lab,  
NOTE Confidence: 0.8304333

00:38:16.440 --> 00:38:19.597 but it requires the biosafety Level 3.  
NOTE Confidence: 0.8304333

00:38:19.600 --> 00:38:21.916 Days and days of hard work.  
NOTE Confidence: 0.8304333

00:38:21.920 --> 00:38:24.824 And so to do this in millions of  
NOTE Confidence: 0.8304333

00:38:24.824 --> 00:38:26.930 people would not be possible.  
NOTE Confidence: 0.8304333

00:38:26.930 --> 00:38:27.306 However,  
NOTE Confidence: 0.8304333

00:38:27.306 --> 00:38:29.938 I hope that the companies are coming  
NOTE Confidence: 0.8304333

00:38:29.938 --> 00:38:32.526 up with similar approach where it's  
NOTE Confidence: 0.8304333

00:38:32.526 --> 00:38:35.166 a little bit more more streamlined

NOTE Confidence: 0.8304333

00:38:35.242 --> 00:38:37.524 and less less cumbersome to be able

NOTE Confidence: 0.8304333

00:38:37.524 --> 00:38:39.584 to look at the neutralizing titer,

NOTE Confidence: 0.8304333

00:38:39.584 --> 00:38:42.090 and one of the proxy for the

NOTE Confidence: 0.8304333

00:38:42.162 --> 00:38:44.514 neutralizing titer is the anti RBD

NOTE Confidence: 0.8304333

00:38:44.514 --> 00:38:46.968 antibody these so they sort of

NOTE Confidence: 0.8304333

00:38:46.968 --> 00:38:49.803 receptor binding domain of the spike protein.

NOTE Confidence: 0.8304333

00:38:49.810 --> 00:38:50.998 That's being targeted.

NOTE Confidence: 0.8304333

00:38:50.998 --> 00:38:52.978 Bispecific antibodies and that tend

NOTE Confidence: 0.8304333

00:38:52.978 --> 00:38:55.542 to have a pretty good correlation

NOTE Confidence: 0.8304333

00:38:55.542 --> 00:38:56.826 with neutralizing titer.

NOTE Confidence: 0.8304333

00:38:56.830 --> 00:38:59.334 So one way to get around the entire

NOTE Confidence: 0.8304333

00:38:59.334 --> 00:39:01.413 sort of cumbersome neutralizing assays

NOTE Confidence: 0.8304333

00:39:01.413 --> 00:39:05.500 to use anti RBD Eliza to monitor antibodies.

NOTE Confidence: 0.8304333

00:39:05.500 --> 00:39:07.660 But I just wanted to reiterate

NOTE Confidence: 0.8304333

00:39:07.660 --> 00:39:09.673 that the Pfizer vaccine Moderna

NOTE Confidence: 0.8304333

00:39:09.673 --> 00:39:11.697 these are extremely effective.  
NOTE Confidence: 0.8304333

00:39:11.700 --> 00:39:14.346 So vast majority of people are  
NOTE Confidence: 0.8304333

00:39:14.346 --> 00:39:17.728 going to be protected and so I think  
NOTE Confidence: 0.8304333

00:39:17.728 --> 00:39:20.020 the the person should be able.  
NOTE Confidence: 0.8304333

00:39:20.020 --> 00:39:21.976 Little bit more comforted by that.  
NOTE Confidence: 0.8304333

00:39:21.980 --> 00:39:22.632 Thank you.  
NOTE Confidence: 0.8304333

00:39:22.632 --> 00:39:22.958 I'm  
NOTE Confidence: 0.83638006

00:39:22.960 --> 00:39:24.928 going to read this one verbatim.  
NOTE Confidence: 0.83638006

00:39:24.930 --> 00:39:27.275 It's a little long when you mentioned  
NOTE Confidence: 0.83638006

00:39:27.275 --> 00:39:29.279 the multisystem nature of long COVID-19  
NOTE Confidence: 0.83638006

00:39:29.279 --> 00:39:31.470 and a potential reservoir of the virus,  
NOTE Confidence: 0.83638006

00:39:31.470 --> 00:39:33.745 and many of the different tissue types.  
NOTE Confidence: 0.83638006

00:39:33.750 --> 00:39:36.216 Do you? Do we have any idea of how  
NOTE Confidence: 0.83638006

00:39:36.216 --> 00:39:38.656 the virus reside in these tissue?  
NOTE Confidence: 0.83638006

00:39:38.660 --> 00:39:40.736 My understanding is that some of  
NOTE Confidence: 0.83638006

00:39:40.736 --> 00:39:42.469 these tissue types mentioned do

NOTE Confidence: 0.83638006

00:39:42.469 --> 00:39:44.215 not express ace two SP receptors.

NOTE Confidence: 0.8226567

00:39:45.810 --> 00:39:49.941 Yes, so I think the consensus is that this

NOTE Confidence: 0.8226567

00:39:49.941 --> 00:39:53.946 virus obviously uses a Stew as a receptor.

NOTE Confidence: 0.8226567

00:39:53.950 --> 00:39:57.310 It also has other requirement like TEMPRESS,

NOTE Confidence: 0.8226567

00:39:57.310 --> 00:40:00.341 which is a protease that enables entry

NOTE Confidence: 0.8226567

00:40:00.341 --> 00:40:03.693 process and so there there are different

NOTE Confidence: 0.8226567

00:40:03.693 --> 00:40:06.639 types of host cell requirement for

NOTE Confidence: 0.8226567

00:40:06.721 --> 00:40:10.235 infection and if you survey the literature,

NOTE Confidence: 0.8226567

00:40:10.240 --> 00:40:13.312 vast majority of the target cells

NOTE Confidence: 0.8226567

00:40:13.312 --> 00:40:15.720 are epithelial in nature so.

NOTE Confidence: 0.8226567

00:40:15.720 --> 00:40:17.950 Nasal cavity the long the

NOTE Confidence: 0.8226567

00:40:17.950 --> 00:40:19.288 intestinal tract kidney.

NOTE Confidence: 0.8226567

00:40:19.290 --> 00:40:21.305 The epithelial cells appear to

NOTE Confidence: 0.8226567

00:40:21.305 --> 00:40:24.190 be a major target of infection,

NOTE Confidence: 0.8226567

00:40:24.190 --> 00:40:27.347 so that's number one and that they

NOTE Confidence: 0.8226567

00:40:27.347 --> 00:40:30.478 have high levels of ACE 2 and #2  
NOTE Confidence: 0.8226567

00:40:30.478 --> 00:40:32.784 is that there are some reports  
NOTE Confidence: 0.8226567

00:40:32.784 --> 00:40:35.439 including our own that detected  
NOTE Confidence: 0.8226567

00:40:35.439 --> 00:40:38.869 virus in the neurons in the brain.  
NOTE Confidence: 0.8226567

00:40:38.869 --> 00:40:41.034 And so there's controversy about  
NOTE Confidence: 0.8226567

00:40:41.034 --> 00:40:43.812 whether it's two is expressed well in  
NOTE Confidence: 0.8226567

00:40:43.812 --> 00:40:46.667 the neurons or the brain, and in fact,  
NOTE Confidence: 0.8226567

00:40:46.667 --> 00:40:50.699 if you look at the M RNA level for a Stew,  
NOTE Confidence: 0.8226567

00:40:50.700 --> 00:40:51.783 it's quite low.  
NOTE Confidence: 0.8226567

00:40:51.783 --> 00:40:54.310 However, if you look at the protein,  
NOTE Confidence: 0.8226567

00:40:54.310 --> 00:40:56.722 it's there an we've also demonstrated  
NOTE Confidence: 0.8226567

00:40:56.722 --> 00:40:58.687 a functional requirement phase two  
NOTE Confidence: 0.8226567

00:40:58.687 --> 00:41:00.457 by neutralizing ace two or blocking  
NOTE Confidence: 0.8226567

00:41:00.457 --> 00:41:02.904 a Stew and showing that the virus  
NOTE Confidence: 0.8226567

00:41:02.904 --> 00:41:04.774 not lingering effects these cells,  
NOTE Confidence: 0.8226567

00:41:04.780 --> 00:41:07.125 indicating that it is it is possible

NOTE Confidence: 0.8226567

00:41:07.125 --> 00:41:09.407 to have these kind of persistent

NOTE Confidence: 0.8226567

00:41:09.407 --> 00:41:11.417 infection in organs that are.

NOTE Confidence: 0.8226567

00:41:11.420 --> 00:41:14.282 Not positive for S2 by M RNA in the

NOTE Confidence: 0.8226567

00:41:14.282 --> 00:41:16.489 standard way of looking at things.

NOTE Confidence: 0.8226567

00:41:16.490 --> 00:41:18.856 But if you look at the protein,

NOTE Confidence: 0.8226567

00:41:18.860 --> 00:41:20.440 they're actually quite positive and

NOTE Confidence: 0.8226567

00:41:20.440 --> 00:41:22.570 that also goes for the placenta.

NOTE Confidence: 0.8226567

00:41:22.570 --> 00:41:24.598 Placenta also has very low levels

NOTE Confidence: 0.8226567

00:41:24.598 --> 00:41:25.950 of the M RNA,

NOTE Confidence: 0.8226567

00:41:25.950 --> 00:41:28.390 and yet if you look at the protein

NOTE Confidence: 0.8226567

00:41:28.390 --> 00:41:30.348 expression it's quite positive there.

NOTE Confidence: 0.8391581

00:41:38.580 --> 00:41:41.060 Hear me OK, OK Now I can hear yes

NOTE Confidence: 0.8391581

00:41:41.060 --> 00:41:44.220 just a little bit. It's good.

NOTE Confidence: 0.85488737

00:41:45.630 --> 00:41:49.246 OK. Are there pediatric cases

NOTE Confidence: 0.85488737

00:41:49.246 --> 00:41:50.966 of lung COVID either post?

NOTE Confidence: 0.802349

00:41:53.080 --> 00:41:56.450 I'm sorry I don't know the acronym ISC  
NOTE Confidence: 0.802349

00:41:56.450 --> 00:42:00.238 or in children who have not had this an  
NOTE Confidence: 0.802349

00:42:00.240 --> 00:42:03.026 ISC right? So the MISC like I  
NOTE Confidence: 0.802349

00:42:03.026 --> 00:42:05.623 mentioned earlier is a rare event  
NOTE Confidence: 0.802349

00:42:05.623 --> 00:42:07.813 that happened in some children.  
NOTE Confidence: 0.802349

00:42:07.820 --> 00:42:11.000 It is very severe.  
NOTE Confidence: 0.802349

00:42:11.000 --> 00:42:13.100 That requires hospitalization and treatment,  
NOTE Confidence: 0.802349

00:42:13.100 --> 00:42:14.780 whereas there are pediatric  
NOTE Confidence: 0.802349

00:42:14.780 --> 00:42:16.460 cases of long COVID.  
NOTE Confidence: 0.802349

00:42:16.460 --> 00:42:19.820 Again, I want to distinguish that from MI.  
NOTE Confidence: 0.802349

00:42:19.820 --> 00:42:22.074 See is these are the children who  
NOTE Confidence: 0.802349

00:42:22.074 --> 00:42:24.210 have mild to asymptomatic COVID  
NOTE Confidence: 0.802349

00:42:24.210 --> 00:42:26.960 infection and then develop overtime.  
NOTE Confidence: 0.802349

00:42:26.960 --> 00:42:30.136 This long term symptoms an I know that  
NOTE Confidence: 0.802349

00:42:30.136 --> 00:42:32.333 many children actually suffer from  
NOTE Confidence: 0.802349

00:42:32.333 --> 00:42:34.985 lung COVID people who are athletes

NOTE Confidence: 0.802349  
00:42:34.985 --> 00:42:37.533 in our very active in different  
NOTE Confidence: 0.802349  
00:42:37.533 --> 00:42:40.122 sports no longer able to run.  
NOTE Confidence: 0.802349  
00:42:40.122 --> 00:42:42.370 You know, because they,  
NOTE Confidence: 0.802349  
00:42:42.370 --> 00:42:45.044 they they they they get post exertional  
NOTE Confidence: 0.802349  
00:42:45.044 --> 00:42:47.858 malaise as well as shortness of breath.  
NOTE Confidence: 0.802349  
00:42:47.860 --> 00:42:50.212 They just can't engage in these  
NOTE Confidence: 0.802349  
00:42:50.212 --> 00:42:51.780 kinds of sports anymore.  
NOTE Confidence: 0.802349  
00:42:51.780 --> 00:42:54.517 There are people who are getting anxiety,  
NOTE Confidence: 0.802349  
00:42:54.520 --> 00:42:54.979 depression,  
NOTE Confidence: 0.802349  
00:42:54.979 --> 00:42:57.733 and other mental issues as a  
NOTE Confidence: 0.802349  
00:42:57.733 --> 00:43:00.663 result of long COVID in the  
NOTE Confidence: 0.802349  
00:43:00.663 --> 00:43:02.619 in the pediatric population.  
NOTE Confidence: 0.802349  
00:43:02.620 --> 00:43:03.284 You know,  
NOTE Confidence: 0.802349  
00:43:03.284 --> 00:43:05.276 and then there are these very  
NOTE Confidence: 0.802349  
00:43:05.276 --> 00:43:06.780 severe cases that happen.  
NOTE Confidence: 0.802349



00:43:06.780 --> 00:43:07.821 The Missy kids,  
NOTE Confidence: 0.802349

00:43:07.821 --> 00:43:10.250 so it's a range of different things,  
NOTE Confidence: 0.802349

00:43:10.250 --> 00:43:12.987 but the long Cove is a very  
NOTE Confidence: 0.802349

00:43:12.987 --> 00:43:14.530 distinct phenotype from the  
NOTE Confidence: 0.802349

00:43:14.530 --> 00:43:16.842 Missy and as as far as I know,  
NOTE Confidence: 0.802349

00:43:16.850 --> 00:43:18.580 I haven't heard of anyone  
NOTE Confidence: 0.802349

00:43:18.580 --> 00:43:19.964 with Missy developing long,  
NOTE Confidence: 0.802349

00:43:19.970 --> 00:43:21.110 Long Cove it,  
NOTE Confidence: 0.802349

00:43:21.110 --> 00:43:23.390 but it's such a rare intersection  
NOTE Confidence: 0.802349

00:43:23.390 --> 00:43:25.824 that you know maybe future  
NOTE Confidence: 0.802349

00:43:25.824 --> 00:43:27.800 investigation will reveal those.  
NOTE Confidence: 0.802349

00:43:27.800 --> 00:43:28.150 Thank  
NOTE Confidence: 0.8359486

00:43:28.150 --> 00:43:30.390 you, how can a long hauler determine  
NOTE Confidence: 0.8359486

00:43:30.390 --> 00:43:32.942 whether there is an issue with viral  
NOTE Confidence: 0.8359486

00:43:32.942 --> 00:43:35.228 reservoir problem or an autoimmune problem?  
NOTE Confidence: 0.815867000000001

00:43:36.320 --> 00:43:37.718 Yeah, excellent question,

NOTE Confidence: 0.8158670000000001

00:43:37.718 --> 00:43:40.514 and that's precisely why we're doing

NOTE Confidence: 0.8158670000000001

00:43:40.514 --> 00:43:42.899 this deep immunological dive into

NOTE Confidence: 0.8158670000000001

00:43:42.899 --> 00:43:45.199 these patients because I believe

NOTE Confidence: 0.8158670000000001

00:43:45.199 --> 00:43:47.400 that these two possibilities may

NOTE Confidence: 0.8158670000000001

00:43:47.400 --> 00:43:49.908 be happening either in subset of

NOTE Confidence: 0.8158670000000001

00:43:49.910 --> 00:43:52.628 patients having one or the other,

NOTE Confidence: 0.8158670000000001

00:43:52.630 --> 00:43:54.890 or another subset having both.

NOTE Confidence: 0.8158670000000001

00:43:54.890 --> 00:43:58.082 Or maybe it's a varying degree that's

NOTE Confidence: 0.8158670000000001

00:43:58.082 --> 00:44:00.330 happening in within a patient.

NOTE Confidence: 0.8158670000000001

00:44:00.330 --> 00:44:02.962 So in order to we would love

NOTE Confidence: 0.8158670000000001

00:44:02.962 --> 00:44:06.270 to find a biomarker for either.

NOTE Confidence: 0.8158670000000001

00:44:06.270 --> 00:44:08.508 A person having a persistent infection

NOTE Confidence: 0.8158670000000001

00:44:08.508 --> 00:44:10.811 or those who are having autoimmunity

NOTE Confidence: 0.8158670000000001

00:44:10.811 --> 00:44:14.211 and with this deep dive we will be able

NOTE Confidence: 0.8158670000000001

00:44:14.211 --> 00:44:16.969 to determine if there are these two

NOTE Confidence: 0.8158670000000001

00:44:16.969 --> 00:44:19.292 different baskets of disease and what

NOTE Confidence: 0.8158670000000001

00:44:19.292 --> 00:44:21.207 parameters are correlating with each.

NOTE Confidence: 0.8158670000000001

00:44:21.210 --> 00:44:22.586 And so you know,

NOTE Confidence: 0.8158670000000001

00:44:22.586 --> 00:44:24.650 I I've actually seen the first

NOTE Confidence: 0.8158670000000001

00:44:24.724 --> 00:44:27.286 glimpse of the data from the long

NOTE Confidence: 0.8158670000000001

00:44:27.286 --> 00:44:29.629 holders and it's really striking.

NOTE Confidence: 0.8158670000000001

00:44:29.630 --> 00:44:31.928 I would love to report this.

NOTE Confidence: 0.8158670000000001

00:44:31.930 --> 00:44:34.690 It's such a such an early look that

NOTE Confidence: 0.8158670000000001

00:44:34.690 --> 00:44:38.012 I I can't even talk about it, but.

NOTE Confidence: 0.8158670000000001

00:44:38.012 --> 00:44:40.668 But I know that there is a signature

NOTE Confidence: 0.8158670000000001

00:44:40.668 --> 00:44:43.120 so very excited to be able to.

NOTE Confidence: 0.8158670000000001

00:44:43.120 --> 00:44:45.064 You don't figure this out soon

NOTE Confidence: 0.8158670000000001

00:44:45.064 --> 00:44:47.439 and report it and to help people.

NOTE Confidence: 0.84366614

00:44:49.080 --> 00:44:50.710 It's really exciting to hear

NOTE Confidence: 0.84366614

00:44:50.710 --> 00:44:53.029 there's more to come in that area.

NOTE Confidence: 0.84366614

00:44:53.030 --> 00:44:54.670 I'm going to read this

NOTE Confidence: 0.84366614

00:44:54.670 --> 00:44:55.982 one verbatim split along.

NOTE Confidence: 0.84366614

00:44:55.990 --> 00:44:58.244 You said earlier that if a virus

NOTE Confidence: 0.84366614

00:44:58.244 --> 00:44:59.940 reservoir is causing long COVID,

NOTE Confidence: 0.84366614

00:44:59.940 --> 00:45:02.236 you'd have to hop up immune system.

NOTE Confidence: 0.84366614

00:45:02.240 --> 00:45:03.396 On the other hand,

NOTE Confidence: 0.84366614

00:45:03.396 --> 00:45:05.130 if the immune system response is

NOTE Confidence: 0.84366614

00:45:05.193 --> 00:45:07.178 causing it by attacking antibodies,

NOTE Confidence: 0.84366614

00:45:07.180 --> 00:45:09.804 you need to slow the Union system down.

NOTE Confidence: 0.84366614

00:45:09.810 --> 00:45:11.450 What happens if both are

NOTE Confidence: 0.84366614

00:45:11.450 --> 00:45:12.762 true went that greatly

NOTE Confidence: 0.84366614

00:45:12.770 --> 00:45:13.426 complicate treatment.

NOTE Confidence: 0.84366614

00:45:13.426 --> 00:45:14.803 Yeah, very tricky, right?

NOTE Confidence: 0.84366614

00:45:14.803 --> 00:45:19.249 But I think there is a way to do this so.

NOTE Confidence: 0.84366614

00:45:19.250 --> 00:45:20.898 The fact that, OK,

NOTE Confidence: 0.84366614

00:45:20.898 --> 00:45:23.960 let's assume a person has both a

NOTE Confidence: 0.84366614

00:45:23.960 --> 00:45:26.101 viral reservoir, an auto, anybody.  
NOTE Confidence: 0.84366614

00:45:26.101 --> 00:45:28.363 We could tackle the viral reservoir  
NOTE Confidence: 0.84366614

00:45:28.363 --> 00:45:30.366 using synthetic treatment like  
NOTE Confidence: 0.84366614

00:45:30.366 --> 00:45:32.446 monoclonal antibody cocktail an.  
NOTE Confidence: 0.84366614

00:45:32.450 --> 00:45:35.170 If we get rid of that reservoir we  
NOTE Confidence: 0.84366614

00:45:35.170 --> 00:45:38.068 get rid of that part of the disease  
NOTE Confidence: 0.84366614

00:45:38.068 --> 00:45:40.790 and then for the autoimmune part  
NOTE Confidence: 0.84366614

00:45:40.790 --> 00:45:43.825 we can basically use treatments  
NOTE Confidence: 0.84366614

00:45:43.825 --> 00:45:45.646 that are immunosuppressive,  
NOTE Confidence: 0.84366614

00:45:45.650 --> 00:45:47.915 which will dampen the autoreactive  
NOTE Confidence: 0.84366614

00:45:47.915 --> 00:45:50.180 cells in those patients so.  
NOTE Confidence: 0.84366614

00:45:50.180 --> 00:45:52.460 I think combination combination of  
NOTE Confidence: 0.84366614

00:45:52.460 --> 00:45:54.284 different approaches and therapy  
NOTE Confidence: 0.84366614

00:45:54.284 --> 00:45:56.714 that are not going to be interfering  
NOTE Confidence: 0.84366614

00:45:56.714 --> 00:45:58.620 with each other is possible.  
NOTE Confidence: 0.8308757

00:46:00.530 --> 00:46:02.530 OK, great and we're getting

NOTE Confidence: 0.8308757

00:46:02.530 --> 00:46:04.130 low on questions folks,

NOTE Confidence: 0.8308757

00:46:04.130 --> 00:46:06.290 so if you have anymore we

NOTE Confidence: 0.8308757

00:46:06.290 --> 00:46:08.530 have a few more minutes.

NOTE Confidence: 0.8308757

00:46:08.530 --> 00:46:09.730 Why wouldn't vaccine?

NOTE Confidence: 0.8308757

00:46:09.730 --> 00:46:11.730 Why wouldn't vaccines cause immune

NOTE Confidence: 0.8308757

00:46:11.730 --> 00:46:13.330 mediated COVID like symptoms

NOTE Confidence: 0.8308757

00:46:13.330 --> 00:46:15.330 like the natural one does?

NOTE Confidence: 0.8308757

00:46:15.330 --> 00:46:17.330 Yeah, another very good question.

NOTE Confidence: 0.8308757

00:46:17.330 --> 00:46:20.578 So the natural infection has a myriad of

NOTE Confidence: 0.8308757

00:46:20.578 --> 00:46:22.928 different effects on the immune system.

NOTE Confidence: 0.8308757

00:46:22.930 --> 00:46:26.154 One of the things that we saw very

NOTE Confidence: 0.8308757

00:46:26.154 --> 00:46:29.267 early on in the COVID patient is

NOTE Confidence: 0.8308757

00:46:29.267 --> 00:46:32.319 a severe decline in the T cells.

NOTE Confidence: 0.8308757

00:46:32.320 --> 00:46:34.623 So the virus infection causes a rapid

NOTE Confidence: 0.8308757

00:46:34.623 --> 00:46:37.844 drop in the T cells and T cells are the

NOTE Confidence: 0.8308757

00:46:37.844 --> 00:46:40.049 central command of the immune system.  
NOTE Confidence: 0.8308757

00:46:40.050 --> 00:46:42.060 If you don't have T cells,  
NOTE Confidence: 0.8308757

00:46:42.060 --> 00:46:44.748 B cells don't know what to do another.  
NOTE Confidence: 0.8308757

00:46:44.750 --> 00:46:46.430 You know innate immune cells  
NOTE Confidence: 0.8308757

00:46:46.430 --> 00:46:48.110 don't know what to do,  
NOTE Confidence: 0.8308757

00:46:48.110 --> 00:46:50.126 so the T cells are this.  
NOTE Confidence: 0.8308757

00:46:50.130 --> 00:46:52.230 This command center is being degraded  
NOTE Confidence: 0.8308757

00:46:52.230 --> 00:46:54.979 or you know diminished by the virus and  
NOTE Confidence: 0.8308757

00:46:54.979 --> 00:46:56.905 so all the subsequent immune responses  
NOTE Confidence: 0.8308757

00:46:56.968 --> 00:46:59.536 that occur are misdirected or not very well.  
NOTE Confidence: 0.8308757

00:46:59.540 --> 00:47:00.641 You know conducted,  
NOTE Confidence: 0.8308757

00:47:00.641 --> 00:47:03.608 whereas in the case of vaccines we have  
NOTE Confidence: 0.8308757

00:47:03.608 --> 00:47:06.488 absolutely no impact on the T cell I mean.  
NOTE Confidence: 0.8308757

00:47:06.490 --> 00:47:09.282 They're not going to touch the T cells  
NOTE Confidence: 0.8308757

00:47:09.282 --> 00:47:12.038 with respect to numbers or their function,  
NOTE Confidence: 0.8308757

00:47:12.040 --> 00:47:14.446 but rather the stimulate them so

NOTE Confidence: 0.8308757

00:47:14.446 --> 00:47:16.437 that the antibody secreting cells

NOTE Confidence: 0.8308757

00:47:16.437 --> 00:47:18.327 the B cells can be engaged,

NOTE Confidence: 0.8308757

00:47:18.330 --> 00:47:21.210 and so the vaccine is really designed only

NOTE Confidence: 0.8308757

00:47:21.210 --> 00:47:24.248 to provide the best kind of immune response,

NOTE Confidence: 0.8308757

00:47:24.250 --> 00:47:26.707 whereas the infection does a whole bunch

NOTE Confidence: 0.8308757

00:47:26.707 --> 00:47:29.353 of other things that interfere with our

NOTE Confidence: 0.8308757

00:47:29.353 --> 00:47:31.645 ability to fight the viral infection.

NOTE Confidence: 0.8308757

00:47:31.650 --> 00:47:33.870 And that's really with all viruses,

NOTE Confidence: 0.8308757

00:47:33.870 --> 00:47:34.314 right?

NOTE Confidence: 0.8308757

00:47:34.314 --> 00:47:36.978 They have so many evasion mechanisms.

NOTE Confidence: 0.8308757

00:47:36.980 --> 00:47:39.092 That that they without them they

NOTE Confidence: 0.8308757

00:47:39.092 --> 00:47:41.150 cannot be a successful pathogen.

NOTE Confidence: 0.8308757

00:47:41.150 --> 00:47:43.268 So there's a huge difference between

NOTE Confidence: 0.8308757

00:47:43.268 --> 00:47:45.517 the immune response that happened to

NOTE Confidence: 0.8308757

00:47:45.517 --> 00:47:47.457 live infectious virus versus those

NOTE Confidence: 0.8308757



00:47:47.457 --> 00:47:49.489 that happened during a vaccination,  
NOTE Confidence: 0.8308757

00:47:49.490 --> 00:47:51.681 and that may be why we're seeing  
NOTE Confidence: 0.8308757

00:47:51.681 --> 00:47:54.331 such an amazing effect of the vaccine  
NOTE Confidence: 0.8308757

00:47:54.331 --> 00:47:55.975 in inducing super physiological  
NOTE Confidence: 0.8308757

00:47:55.975 --> 00:47:57.450 levels of antibody.  
NOTE Confidence: 0.8308757

00:47:57.450 --> 00:47:59.892 Meaning most people don't develop that  
NOTE Confidence: 0.8308757

00:47:59.892 --> 00:48:02.980 kind of anybody with a natural infection.  
NOTE Confidence: 0.8308757

00:48:02.980 --> 00:48:05.416 But with the two dose of vaccine,  
NOTE Confidence: 0.8308757

00:48:05.420 --> 00:48:07.718 we're seeing like incredible titers of  
NOTE Confidence: 0.8308757

00:48:07.718 --> 00:48:09.947 anybody that's going to hopefully give  
NOTE Confidence: 0.8308757

00:48:09.947 --> 00:48:12.720 us protection for at least a year or so.  
NOTE Confidence: 0.8308757

00:48:12.720 --> 00:48:14.460 So that's really the difference.  
NOTE Confidence: 0.87985843

00:48:15.780 --> 00:48:18.258 Thank you, I think we might have  
NOTE Confidence: 0.87985843

00:48:18.258 --> 00:48:21.138 time for one or two more questions,  
NOTE Confidence: 0.87985843

00:48:21.140 --> 00:48:23.947 so the topic of children hasn't really  
NOTE Confidence: 0.87985843

00:48:23.947 --> 00:48:26.118 been discussed much in this area.

NOTE Confidence: 0.87985843

00:48:26.120 --> 00:48:29.950 So could you talk to us about long COVID and

NOTE Confidence: 0.87985843

00:48:29.950 --> 00:48:31.870 do children get it right?

NOTE Confidence: 0.87985843

00:48:31.870 --> 00:48:34.926 So I have heard you know the children.

NOTE Confidence: 0.87985843

00:48:34.930 --> 00:48:37.594 The data are still coming out because you

NOTE Confidence: 0.87985843

00:48:37.594 --> 00:48:40.289 know they just became eligible recently,

NOTE Confidence: 0.87985843

00:48:40.290 --> 00:48:43.006 so we don't know what the impact

NOTE Confidence: 0.87985843

00:48:43.006 --> 00:48:45.445 of the vaccines are for the

NOTE Confidence: 0.87985843

00:48:45.445 --> 00:48:47.420 long COVID in children yet.

NOTE Confidence: 0.87985843

00:48:47.420 --> 00:48:49.350 However, we know that Long

NOTE Confidence: 0.87985843

00:48:49.350 --> 00:48:51.849 Cove it does happen in children

NOTE Confidence: 0.87985843

00:48:51.849 --> 00:48:54.279 even in very young children,

NOTE Confidence: 0.87985843

00:48:54.280 --> 00:48:57.448 so I think that you know that this

NOTE Confidence: 0.87985843

00:48:57.448 --> 00:48:59.675 unfortunate doesn't spare people over

NOTE Confidence: 0.87985843

00:48:59.675 --> 00:49:02.853 younger age and unlike the infection itself,

NOTE Confidence: 0.87985843

00:49:02.860 --> 00:49:04.680 most people who are younger

NOTE Confidence: 0.87985843

00:49:04.680 --> 00:49:07.124 are having very mild or some  
NOTE Confidence: 0.87985843

00:49:07.124 --> 00:49:09.296 asymptomatic infection was alone.  
NOTE Confidence: 0.87985843

00:49:09.300 --> 00:49:11.868 COVID can happen in this group,  
NOTE Confidence: 0.87985843

00:49:11.870 --> 00:49:14.342 so I think that's really more  
NOTE Confidence: 0.87985843

00:49:14.342 --> 00:49:17.280 reason why we need to accelerate.  
NOTE Confidence: 0.87985843

00:49:17.280 --> 00:49:18.812 Vaccination in the younger  
NOTE Confidence: 0.87985843

00:49:18.812 --> 00:49:20.344 people because you know,  
NOTE Confidence: 0.87985843

00:49:20.350 --> 00:49:22.666 even though they might recover with  
NOTE Confidence: 0.87985843

00:49:22.666 --> 00:49:24.960 a mild infection with the kovid,  
NOTE Confidence: 0.87985843

00:49:24.960 --> 00:49:27.648 they may suffer from long term symptoms.  
NOTE Confidence: 0.87985843

00:49:27.650 --> 00:49:29.948 An I think the vaccines done.  
NOTE Confidence: 0.91688365

00:49:31.930 --> 00:49:35.146 And the last question of the morning is.  
NOTE Confidence: 0.77377456

00:49:37.170 --> 00:49:38.900 Add Seed's answer suggests that  
NOTE Confidence: 0.77377456

00:49:38.900 --> 00:49:40.630 vaccines will provide better long  
NOTE Confidence: 0.77377456

00:49:40.688 --> 00:49:42.658 term immunity than natural infection.  
NOTE Confidence: 0.85586125

00:49:44.200 --> 00:49:46.608 Yes, I believe it does because of

NOTE Confidence: 0.85586125

00:49:46.608 --> 00:49:50.015 what I just said that the the vaccines

NOTE Confidence: 0.85586125

00:49:50.015 --> 00:49:52.310 are inducing incredible levels of

NOTE Confidence: 0.85586125

00:49:52.388 --> 00:49:54.728 neutralizing anybody as well as just

NOTE Confidence: 0.85586125

00:49:54.728 --> 00:49:57.499 a high tide or anybody and they're

NOTE Confidence: 0.85586125

00:49:57.499 --> 00:49:59.917 seeming to be pretty well maintained.

NOTE Confidence: 0.85586125

00:49:59.920 --> 00:50:02.580 Over time there was a study that

NOTE Confidence: 0.85586125

00:50:02.580 --> 00:50:05.445 examined them at six months point an

NOTE Confidence: 0.85586125

00:50:05.445 --> 00:50:08.380 the titers are still staying very high,

NOTE Confidence: 0.85586125

00:50:08.380 --> 00:50:11.005 so that kind of very slow regression

NOTE Confidence: 0.85586125

00:50:11.005 --> 00:50:13.730 of the antibody levels suggests that.

NOTE Confidence: 0.85586125

00:50:13.730 --> 00:50:15.644 The longevity as well as potency

NOTE Confidence: 0.85586125

00:50:15.644 --> 00:50:18.025 of antibody may be better after

NOTE Confidence: 0.85586125

00:50:18.025 --> 00:50:20.109 vaccination than unnatural infection,

NOTE Confidence: 0.85586125

00:50:20.110 --> 00:50:22.534 and so hopefully I mean this

NOTE Confidence: 0.85586125

00:50:22.534 --> 00:50:25.300 is really our way out of this.

NOTE Confidence: 0.85586125

00:50:25.300 --> 00:50:28.476 Pandemic is to get vaccinated and to be  
NOTE Confidence: 0.85586125

00:50:28.476 --> 00:50:30.889 protected from acute and long covid.  
NOTE Confidence: 0.84953994

00:50:32.300 --> 00:50:33.625 Wonderful well keep going keep  
NOTE Confidence: 0.84953994

00:50:33.625 --> 00:50:35.570 going just have to say thank you  
NOTE Confidence: 0.84953994

00:50:35.570 --> 00:50:37.280 so much for spending your Saturday  
NOTE Confidence: 0.84953994

00:50:37.280 --> 00:50:38.815 morning with this wonderful group  
NOTE Confidence: 0.84953994

00:50:38.815 --> 00:50:40.645 of Yale School of Medicine alumni.  
NOTE Confidence: 0.84953994

00:50:40.650 --> 00:50:42.090 It was a fascinating talk.  
NOTE Confidence: 0.84953994

00:50:42.090 --> 00:50:43.334 I everyone's questions were  
NOTE Confidence: 0.84953994

00:50:43.334 --> 00:50:45.200 answered so thank you so much  
NOTE Confidence: 0.84953994

00:50:45.264 --> 00:50:46.986 and enjoy the rest of your day.  
NOTE Confidence: 0.79829794

00:50:47.550 --> 00:50:49.258 Thank you so much  
NOTE Confidence: 0.79829794

00:50:49.260 --> 00:50:51.941 Aaron. OK thanks everybody and I will  
NOTE Confidence: 0.79829794

00:50:51.941 --> 00:50:55.020 share that Dean Stun Bermond is talking  
NOTE Confidence: 0.79829794

00:50:55.020 --> 00:50:57.798 at 11:00 o'clock if anyone's interested.  
NOTE Confidence: 0.79829794

00:50:57.800 --> 00:51:01.230 He's the School of Public Health teen

NOTE Confidence: 0.79829794

00:51:01.230 --> 00:51:04.728 and he's also talking about COVID.

NOTE Confidence: 0.79829794

00:51:04.730 --> 00:51:06.140 In the public health setting,

NOTE Confidence: 0.79829794

00:51:06.140 --> 00:51:09.299 so you can switch over for an 11:00 o'clock

NOTE Confidence: 0.79829794

00:51:09.299 --> 00:51:11.066 presentation if you're interested and

NOTE Confidence: 0.79829794

00:51:11.066 --> 00:51:13.664 enjoy the rest of your alumni weekend.